VOL. XV, No. 16 CHICAGO, APRIL 22, 1909 $3.00 PER YEAR

MOTOR AGE

NINE STATES INCLUDED IN THE GLIDDEN

TO those to whom Horace Greeley's advice of "go west" has appealed, the 1909 Glidden tour will have a peculiar fascination in its westward dash from Detroit, the great motor manufacturing center of America, to Denver, the playground of millionaires, and the return jaunt eastward to Kansas City. This tentative route, over which Dai H. Lewis has been guiding the path-finding E-M-F exploration for 10 days, contrasts strongly with the 1,670-mile tour of last year through the eastern states, and which embraced in its itinerancy six mountain ranges. If last year the tour was one of hills and water breaks, this year both will be wanting in the majority of the runs, but in places hills equally difficult with those of Maine will be encountered. This year the vast expanse of the plain, the limitless agricultural areas, the long straight road stretches will be the predominating conditions, all punctuated freely by the free-heartedness of the west and the hospitality which is not exceeded by the vastness of the territory.

Covers Nine States

As already planned, the Glidden tour will embrace nine states: Starting with Detroit, the first leg of the 2-day run to Chicago, with a mid-way night stop at Kalamazoo; the second stretch is from the Windy City northwestward through Wisconsin to Minneapolis, approximately 411 miles, and divided into three comparatively easy stages: from the Twin Cities the course lies southwestward, through Iowa to Omaha; from Omaha the route follows the trans-continental one across Nebraska and dipping into the center of Colorado at Denver, the turning point of the trip; the last stage will be a 3 or 4-day run eastward across the wheat fields of Kansas, from Colorado Springs to Kansas City, with night

FIRST DAY

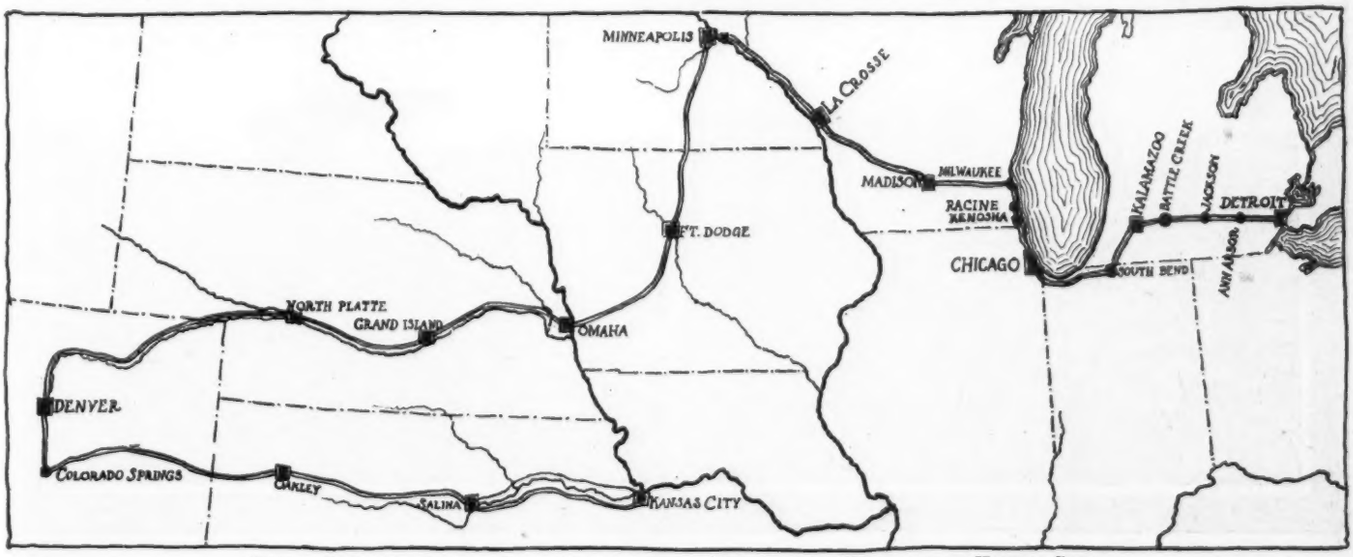
	Miles
Detroit	
Dearborn	10.4
Inkster	13.9
Eloise	15.6
Wayne	17.7
Canton	22.5
Denton	25.2
Ypsilanti	30
Ann Arbor	38.6
Lima Center	49.4
Chelsea	53.5
Grass Lake	65
Leoni	68.1
Jackson	75.3
Sandstone	81.2
Parma	85.5
Albion	93.7
Marshall	105.2
Ceresco	110.2
Postumville	117.1
Nickols	117.4
Battle Creek	118.5
Urbandale	121.5
Level Park	124.2
Augusta	128.7
Galesburg	133.6
Comstock	138.4
Kalamazoo	142.2

SECOND DAY

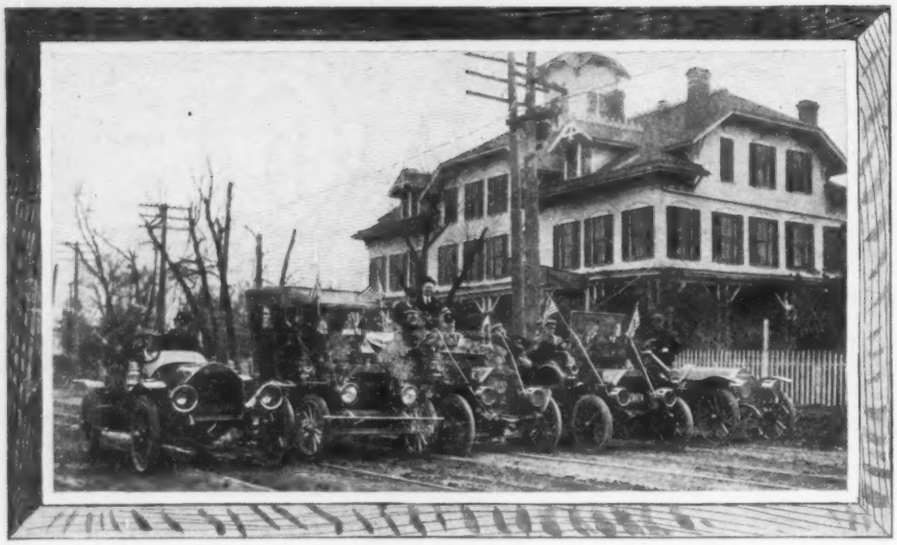
	Miles
Kalamazoo	
Almena	13.5
Paw Paw	19.2
Decatur	29.5
Dowagiac	44.7
Pokagon	51.2
Sumnerville	52.8
Niles	59.1
South Bend	70.1
New Carlisle	84.1
La Porte	97
Pinhook	105.3
Westville	108.9
Valparaiso	119.8
Wheeler	127.6
Hobart	132.9
Highlands	144.5
Hessville	146.8
Hammond	151.3
South Chicago	
Chicago	173.2

THIRD DAY

	Miles
Chicago	
Evanston	12.1
Kenilworth	15.6
Glencoe	20.3
Highland Park	26.1
Fort Sheridan	28.7
Lake Forest	32.4
Lake Bluff	34.7
North Chicago	37.7
Waukegan	40.4
Zion City	46.7
Winthrop Harbor	49.1
Kenosha	55.9
Lake Shore	62.7
Racine	66.9
South Milwaukee	81.2
Cudahy	84.6
St. Francis	86
Milwaukee	91.2
Brookfield	104
Pewaukee	110.4
Hartland	115
Nashotah	118
Okaughee	120
Gifford	121.4
Oconomowoc	123.4
Ixonia	129
Watertown	136.4
Hubbleton	144.3
Portland	149.2
Waterloo	151.1
Marshall	155.5
Sun Prairie	163.4
Burke	170.5
Madison	175



MAP OF PROPOSED GLIDDEN TOUR, STARTING FROM DETROIT AND FINISHING AT KANSAS CITY



CHICAGO RECEPTION COMMITTEE MEETS SCOUTS IN INDIANA

stops at Oakley, Salina, and probably one other point. All told, the tour will embrace something over 2,000 miles, measuring, perhaps, 500 to 600 miles in excess of previous tours. Last year the daily mileage averaged 139.1, and this year it will, in all probability, exceed 145 miles, and some days may go beyond the 200-mile figure.

"The Silver Tour"

Although already dubbed by many enthusiasts "the silver tour" because of invading the home state of William Jennings Bryan, whose widespread political aspirations have made Nebraska the center of much national comment, the tour may before its completion, be designated "the gold tour" because of the fruitful selling field through which the course, as already outlined, passes. Wisconsin is already one of the big selling states of the west, and, when Minneapolis is reached, the motorists are at the doorway to the two Dakotas and other big selling territories. Iowa has already established a strong reputation as the buyer of $1,000 to $1,500 cars, and from out its length and breadth comes a demand for machines selling as high as $2,500. With present arrangements, however, the tour traverses only the northwestern quarter of the state, which is far from being the most valuable, and not so good a selling field as the central belt bordering on the trans-continental route across the state in direct line between Clinton and Omaha. To the manufacturer, Nebraska is not so fruitful a selling territory as Iowa, but it is a younger state and, although farm lands now sell at any price from $40 to $100 per acre lower than in the central belt of Iowa, the Nebraska lands are increasing in value and some day will exceed those of Iowa. The future of Kansas, as a wheat-growing state, is well known, and already the motor car has taken hold of the farming classes, which augurs well for immense sales. To illustrate the Kansas buying propensities, one example will suffice, in which one dealer in Hutchinson sold ninety-seven cars in 1 month. Throughout this state, as well as in Nebraska and Iowa, are population centers which, as far as the manufacturer in the east is concerned, are not on the map, but in which the small-car manufacturer has found fruitful selling ground, and in which the big-car maker will find a market at the completion of the present tour. One great difference between the Glidden tour of 1909 and that of previous years is that this year it will be a continual demonstration trip.

From Detroit to Chicago

The run from Detroit to Chicago of 315 miles offers little in the nature of a severe test for motor cars. In the entire distance there is nothing deserving the name of hill, but plenty of sand will be encountered in places as far as South Bend. At times it is deep, sufficiently deep to call for low-gear work. The worst part of the whole Detroit-Chicago stage, from a road point of view, is the first 20 miles out of Detroit, in which the road is generally bad. From a pleasure-seeking point of view, there is little of attraction in this stage of the journey, which is relieved of its monotony, however, by Ann Arbor, wherein is located the state university, and other population centers, such as Jackson, where is located the plant of the Jackson Automobile Co.; Battle Creek, world famous for its breakfast foods, and South Bend, which has already been visited a couple of times by Glidden tours. From South Bend to Chicago the route lies along the old St. Louis-tour pilgrimage by way of La Porte and Valparaiso. The first stage will be a pastoral one, with nothing to enthuse more than the prospect of Chicago and the fascinating run along the lake from the Windy City to Milwaukee.

Chicago to Madison

Starting from Chicago on the third day of the tour, the travelers pass through 40 miles of as picturesque and interesting surroundings as may be found anywhere in the country. The run along the Lake

ROAD ENCOUNTERED ENTERING BATTLE CREEK, MICH.

A BIT OF HEAVY GOING IN MICHIGAN

Shore drive, with its historic residences, the Grant monument and Zoo in Lincoln park; the splendid residences and educational institutions of Evanston, the beautiful winding drive through Kenilworth, Glencoe, Fort Sheridan and Lake Forest, and the long straightaway to North Chicago, combine to furnish a variety which keeps the tourists employed in asking questions and keeping their eyes open for surprises for a couple of hours at least, and this section of the Glidden long will be remembered.

Chicago motorists have long regarded the run along the north shore as one of the most pleasant in the central west, and the only objection from the tourists' standpoint is the strict speed restrictions which prevail in every village passed through. The highway is a boulevard for 40 miles, and following closely after the splendid roads between South Bend and Chicago, gives the tourist an idea that all western roads are better on the average than in the east.

The welcome accorded the travelers by the soldiers of Uncle Sam at Fort Sheridan promises to be noteworthy, and the sights incident to the great military colony are likely to be novel to a majority of the tourists. From North Chicago to Milwaukee the roads vary from superb to passable, with very small excuse for complaint on the part of a good driver, and there are several places of interest to be discussed.

Sights at Waukegan

At Waukegan are the great wire manufacturers and kindred plants; at Zion City, 7 miles on, are the unique buildings, industries and the customs which have made the community famous. It is to be hoped that every smoker will have finished his after-breakfast cigar before reaching Zion City, for the rules are strict in the town against the use of tobacco in any form. Signs at each end of the city notify the uninformed that neither tobacco nor profanity is permitted, so one is not expected even to swear lightly over the fact that the cigar had to be thrown away.

BIDDING FAREWELL TO PATHFINDERS AT DETROIT

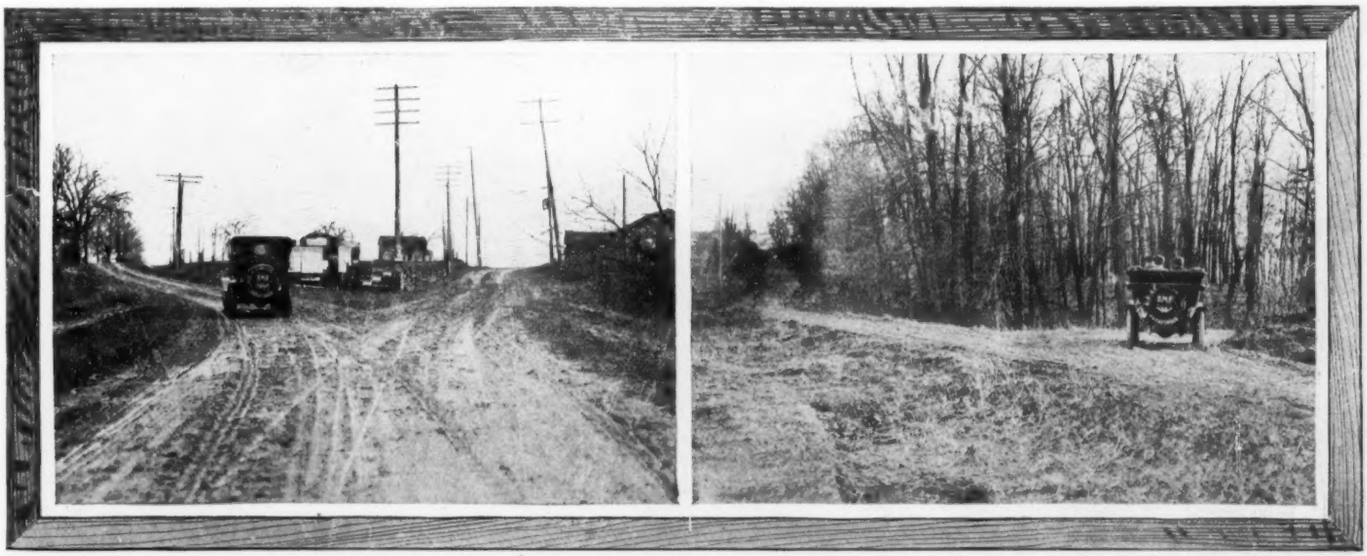
Wisconsin's Motor Plants

At Kenosha is the great plant of Thomas B. Jeffery & Co., makers of the Rambler car; and at the next real city, Racine, is the home of the Mitchell motor car. These plants are but 15 miles apart, and they combine as the nucleus of Wisconsin's motor car manufacturing industry. The run from Racine to Milwaukee offers no particular features. The road is fair and the scenery enjoyable. St. Francis school, on the right approaching the city, is known all over the country and is beautifully situated.

Going into Milwaukee the travelers get an excellent idea of the tremendous manufacturing interests which have made Milwaukee famous, not alone for beer, but for other products. The great packing plants, the machinery plants, and concerns making motor car accessories, all line the course. Arriving at the heart of the city, it is certain that a welcome will be accorded such as has been offered Glidden tourists on few occasions. Members of the Milwaukee Automobile Club are sadly disappointed that the tourists will not make that city a night stop, but they are bound to make the best of the situation, and promise to compel the tourists to remember Milwaukee for a long time. Milwaukee motorists are an enthusiastic coterie. Leaving Milwaukee the route lies along Grand avenue, the leading shopping street for a few blocks, then converting itself gradually into a splendid residence district. The road is perfect for the entire distance to the city limits. Here a new bridge is being erected, and if finished will give the travelers a pleasing exit from the city.

Easy Trail to Madison

Once out of Milwaukee, the guide book is practically unnecessary, as a blind man could follow the trail without getting lost more than two or three times all the way to Madison. The road is practically

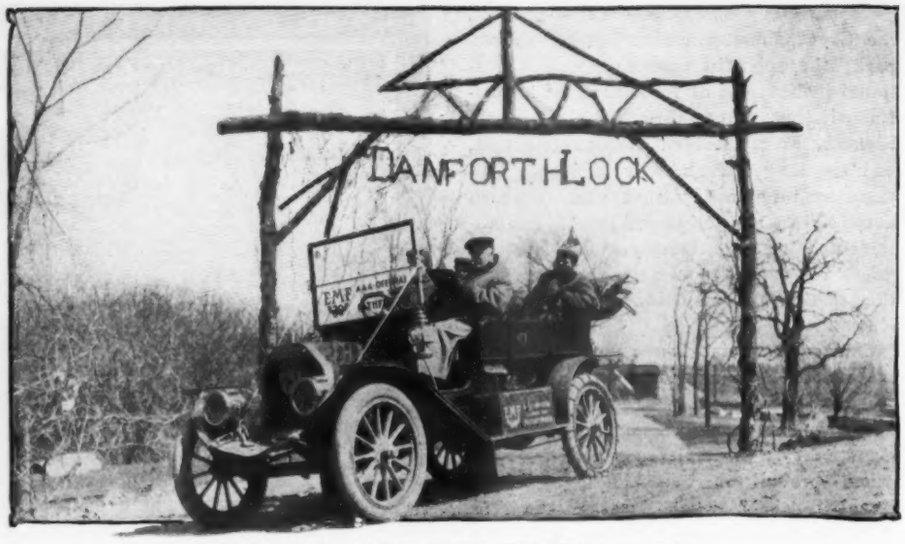


LEFT FORK GOES TO MACHOTT, MICH.

OUTSIDE OF CHELSEA, TURNING RIGHT

straight west for 80 miles at this point. About 35 miles out of Milwaukee is Oconomowoc, one of the most famous summer resorts in the central west, and the scenery in the neighborhood is superb. Beautiful residences with wide-spreading lawns, lakes dotted with pleasure craft, and natural woods all add to the pleasure of the traveler in that part of the country. Watertown, the next city of any size, is a manufacturing community with enterprise enough to keep the roads in spl ndid condition, a feature which might be emulated by residents of the neighboring town of Hubbleton, where the roads are in far worse condition than out in the open country. A few hills will be found between Watertown and Madison, the first of any consequence on the tour from Detroit, but they will not be hard to take.

In Madison itself the streets are splendidly kept, and the approach to the great capitol building, now in process of construction, is very gratifying. Surrounding the town are beautiful and large lakes; the hotels are not large, but well appointed for a city of the size, the people are cordial and willing for the tourists to enjoy all the good things of Madison, and altogether the night stop promises to prove satisfactory.



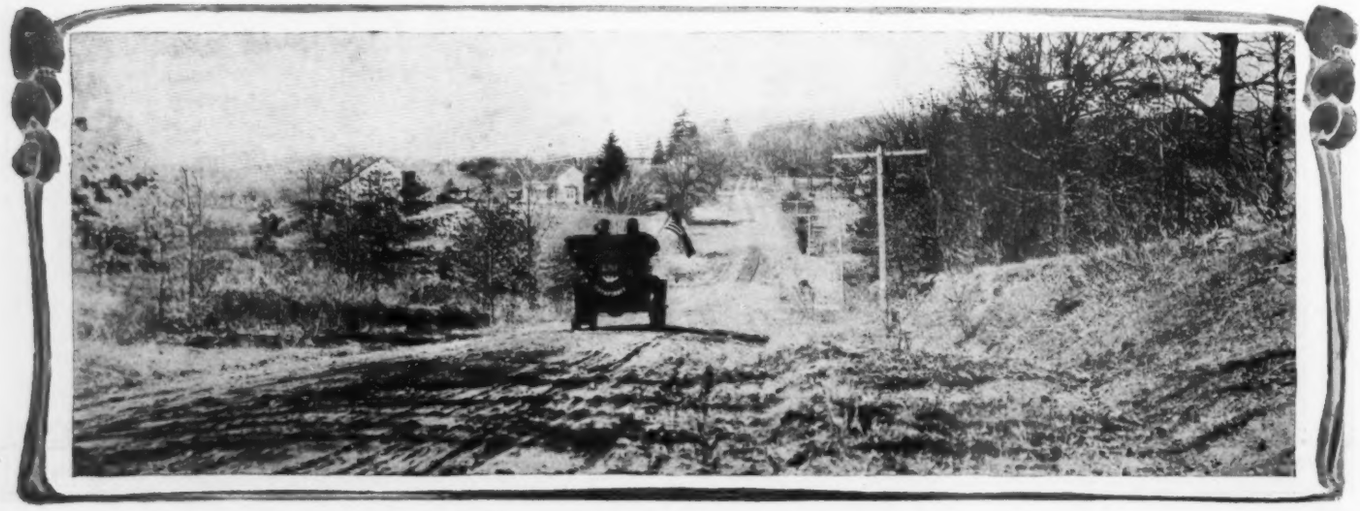
Picturesque Spot Found Near Madison, Wis.

One of the noticeable features of the trip as experienced by the pathfinders, is the anxiety of the westerner to make the tourists welcome. The spirit is far more pronounced than in the east, as has been shown by the manner in which the motorists organized or unattached, offer to help map out the route. The Milwaukee club insisted upon sending out guides to Madison, and not an inch of the route was lost. At Madison two guides, one from La Crosse and another from Minneapolis, were ready to show the best route to the Twin Cities. Meanwhile a delegation from Minneapolis awaited the pathfinders at La Crosse, with urgent request that several days be spent by the Gliddenites at Minneapolis and St. Paul.

Glidden Trail Runs Through Quaint Zion City

Pathfinder in Wisconsin

Wonewoc, Wis., April 20—From Madison to LaCrosse, Wis., is but 125 miles, a short day's run for a touring party in July but a trip that looks even longer than from Chicago to New York when the rains are in control and the mud deep. Sunday morning in Madison was wet, very wet, so wet in fact that Chief Pilot Lewis decided not to do any running during the day. A short visit of sunshine changed the plans of the party



Broad Roads and Some Hills are Encountered Near Pinhook, Mich.

PATHFINDER GREETED BY HOSPITABLE MILWAUKEEANS

and it was decided to start for Baraboo, the winter home of Ringling's circus, and a town almost as well known throughout the country as Milwaukee. The all-night rains Saturday converted the roads into impassable quagmires that made low gear work a nearly-all-the-time essential. Night found the tourists no farther than Sauk City, little more than half way to Baraboo. But the rains had not ceased and Monday morning broke with worse roads than did Sunday. The Monday run, 35 miles from Sauk City to Reedsburg, was one continual fight with seas of mud. In the summer season these roads will be such as to hourly tempt the tourists to throw legal limits to the winds but in the spring the mixture of clay with gravel in places makes a roadway very difficult of negotiating.

From Reedsburg to Wonewoc

Today's run from Reedsburg to Wonewoc was but 15 miles and was another thrilling experience with mud and Neptune. Thus have passed 3 days since leaving Madison and not half of the 125 miles to La Crosse accomplished, whereas it was expected 2 days would be ample to complete the task and the third day would see the party in Minneapolis. From Minneapolis the route will lie to Dodge City, Ia., or some other town in that locality and here it is expected will begin the unique feature of the 1909 Glidden, namely the use of a special train of Pullman and dining cars to accommodate the travellers at nights in towns where sufficient hotel accommodation cannot be obtained. Definite plans are not yet completed but it is rumored that the train will meet the party the first night out of Minneapolis. On this train three dining cars and about ten Pullman sleepers should prove sufficient for the party. It is not known what arrangements will be made in Omaha but undoubtedly those who prefer staying at hotels can do so, or if the train has greater delights for them they can make use of it.

Pullmans Will Be Appreciated

Once out of Omaha the necessity of the train will be realized until Denver is reached and its usefulness will again be appreciated in the cross-Kansas jaunt to Kansas City. While in Denver the numerous hotels will naturally appeal stronger to the westwardites than berths in sleepers. All told, however, it will be interesting to note the unprecedented interest the combination of Glidden tour and Pullman train will have on the party on this unique jaunt from Minneapolis to Kansas City.

ALONG SHORE OF LAKE AT OCONOMOWOC, WIS.

TEMPTING STRETCH OF HIGHWAY THAT FACES TOURIST UPON LEAVING KALAMAZOO

PENN PASSES CROSS-STATE HIGHWAY BILL

HARRISBURG, PA., April 19—It was only by setting back the hands of the clock, thus extending the legislative day, that the cross-state highway bill was finally passed by the Pennsylvania state legislature last Thursday afternoon. It is understood that the governor will sign the bill, and that he and the attorney general and highway commissioner will get busy on the location problem as soon as they clear their desks of the flotsam and jetsam remaining after the long session of the legislature.

House bill No. 239, as the cross-state highway measure is officially known, provides for a 45-foot wide highway—with the proviso that the improved part shall not exceed 20 feet in width—from Philadelphia to the Ohio state line, passing through the capital of the state, Harrisburg, en route. As finally passed, the bill calls for the locating of the route by the governor, attorney general and state highway commissioner, and the building of the highway by the latter and his assistants, with the preference given to American workmen in hiring the necessary labor. As soon as the road or any part of it has been located, the state highway commissioner is empowered to have the necessary surveys made and to begin the work of construction as soon as possible. Of the whole amount of $5,000,000 appropriated for the purpose, $3,000,000 "shall be available in the 2 fiscal years ending May 31, 1911, and $1,000,000 in each of the 2 years next following." Funds for the starting of the preliminary work of location will therefore be available within 6 weeks.

The state highway commissioner is given broad powers in pushing along the work. He is authorized to take any "bridges, roads, highways, turnpikes and streets that are now built or opened within the line of said road as located, and to rebuild such bridges and to straighten, regrade and improve the said highways." The maximum width of 45 feet is not to obtain where a "street or alley within the limits of any incorporated city, town or borough" is concerned. Damages suffered by abutting property owners through regrading of road or by taking any toll turnpike or toll bridge are provided for. The claimant files an appeal with the court of common pleas of his county, which shall appoint three disinterested viewers—at $10 per day each—who shall award damages. The state and the claimant are given 15 days in which to appeal from the award. Pending the result of appeal, which is to the common pleas court of the county in which the property affected is located—or in the case of a bridge, road or other property on the line between two counties, to the same court in either of them—the state highway commissioner is empowered to take immediate possession of the alleged damaged property or bridge or toll road. If the latter, the collection of tolls ceases as soon as the commissioner takes over the property.

Section 6 of the act makes it "unlawful for any trolley road or electric or street railway or any steam railroad," to build its line along and upon the new cross-state road, and, except in incorporated cities, towns and boroughs, it shall be unlawful for any such road to cross the new state highway at grade. Where it becomes necessary to locate the new road on any road, highway or bridge on which railroads, steam or electric, are already operated, "the same shall not in any way be interfered with. Provided, however, that the state highway commissioner is hereby authorized to enter into contracts with such * * * roads for the removal of the same from the line of said state road or highway and relocating and reconstructing the same in accordance with said contract." The state will maintain all portions of the new road except those "within the limits of any incorporated city, town or borough into or through which the road may pass."

GATES MILLS HILL AVAILABLE

Cleveland, O., April 19—If present plans do not go astray, the 1909 hill-climb of the Cleveland Automobile Club will bring back memories of the climbs of 1905 and 1906. For the last 2 years, owing to the loss of Gates Mills hill, the local club has been forced to use any hill that could be found. But now comes word that in all probability there will be no further opposition to the use of Gates Mills, and big preparations are being made for the event, which is scheduled for May 31, the Monday following Decoration Day. This, by the way, is the legal holiday. A canvass among the dealers and manufacturers in Cleveland regarding the climb seems to indicate that the events will be well filled this year. Both Stearns and White have promised to enter, according to the announcement made by the secretary of the club, while there will be no trouble in securing entries of most of the cars sold here. So far it has been decided to give the same number of events as last year.

SIOUX CITY OUTLOOK

Sioux City, Ia., April 19—Although the conditions in and around Sioux City are not exactly favorable to the very extensive use and sale of motor cars, local dealers are optimistic over the outlook for the coming summer. It is predicted that before the season is over no fewer than 450 cars will be sold here. This is a tremendous increase over former years, due perhaps to the increased number of agencies established here during the last 8 months. One year ago there were but two agencies with a half dozen makes represented, while today there are ten. Four years ago fifty cars a year was considered a good business; in 1907 there were seventy-five, and in 1908 double the number of the previous year were sold. Sioux City dealers are depending principally on the surrounding territory for their sales this summer. The many steep hills are a drawback in the vicinity of the city, but there is a large territory to draw from and agents are extending their influences to South Dakota, northwestern Iowa and other points within a radius of 200 miles.

COLORADO IN LINE

Denver, Colo., April 17—The good roads cause was given great impetus in Colorado recently by the passage of a state aid bill in which the sum of $150,000 will be appropriated from the state funds. The various counties will have twice that amount to spend on the roads, thus making a total of $450,000 to be spent in improving the roads next year. A highway commission of three members is created, one to serve for 2 years, one for 4 years and one for 6 years, the appointments to be made by the governor. The chairman of this commission will receive $1,200 per year, and the other two members will receive $600 per year each. The secretary of the commission must be a practical road builder and civil engineer, and his salary shall not exceed $2,500. The board of county commissioners are required to have prepared duplicate road maps showing all public roads, designating which should be improved first, and which, when improved, will provide an appropriate system of main roads.

CONVERTING THE CHURCH

Rome, April 10—To Archbishop William O'Connell of Boston belongs the credit for breaking down the barriers that kept the motor car from being frequently used by high prelates of the Catholic church. His visit to Rome is unique in two ways—he comes in his own motor car and he stops at a modern hotel in a thoroughly modern quarter. This in America, is of course perhaps commonplace as far as the hotel part is concerned, but not so the motor car. Until lately the motor car has been a moot point at the apostolic palace. It was "too worldly," "too undignified," "too dangerous," etc. Cardinal Satolli desired to go back and forth from Rome to his parish of Frascati, only 14 miles away, in this fashion and thus not be dependent upon slow, crowded and dirty trains, but the moral atmosphere was too much for him and he has not got one yet. When Mrs. Pullman, of Chicago, went to her private audience with Pius X. she had to hire a carriage, as her motor car was not allowed within the Vatican grounds. Last year Cardinal Merry Del Val went back and forth to Vacarello for a cure of the waters every day for some time in a motor car. However, to the archbishop of Boston

was reserved the privilege of being the first high prelate to actually come to Rome in his own motor car and use it as he would a carriage. So that marks an epoch in Rome. It is a car, too, of American manufacture.

NORRISTOWN ENTRIES

Norristown, Pa., April 19—That the second annual endurance run of the Norristown Automobile Club will be a success, in point of numbers at least, was made evident on Saturday last, when the committee published a list of twenty-five entrants who had signified their intention of competing even before the entry blanks had been issued. Of these, ten were of the manufacturers' and sales agents' class, the remainder of the members' class. Of the former there are two each of the Oldsmobile and American and one each of the Regal-Detroit, Maxwell, Mitchell, Overland, Studebaker and Buick. In the members' class there are three Mitchells, the same number of Buicks, two each of Crawford and Overland, and single representatives of the Winton, Pierce, Matheson, Locomobile and Pope-Toledo. With this nucleus, and with the closing date for entries still some time away, the claim of the contest committee that the Norristown run would be the largest held in the east this year seems in a fair way of being verified.

OF INTEREST TO INVENTORS

Washington, D. C., April 18—Inventors and factory superintendents will be interested to learn that Senator McEnery has introduced a bill in congress providing that all letters patent hereafter granted by the United States, or any interest in a patent hereafter granted, the ownership of which is vested in the original inventor or conceiver of the thing patented, shall be exempted from seizure for debt of any kind, except such debt as may be voluntarily contracted by such original inventor by mortgage, hypothecation, or pledge of such patent, or part or parts thereof. Such exemption will not apply to the proceeds arising from the sale of such patent, either in whole or part, nor shall it apply to any product of such patent, in whole or part, that may be disassociated from such patent.

WASHINGTON SPEEDWAY OPEN

Washington, D. C., April 18—Motor cars played a very prominent part in the opening of the speedway yesterday evening. The idea of having a band play several afternoons on Washington's famous speedway skirting the Potomac river originated with Mrs. Taft, and with the president she was present at the opening concert in their new landaulet. In addition to the presidential motor car, there were hundreds of machines containing notable people. It is estimated that during the afternoon 2,000 motor cars were on the speedway, which had been specially oiled for the occasion.

Ready at Chattanooga For the Mountain Climb

Chattanooga, Tenn., April 19—Historic old Lookout mountain is the scene of greater activity these days than at any time since the Yankee army stormed the stronghold of the confederates and forced a surrender. The daring motor car drivers have captured the famous old mountain and are sending their cars up the fine road, replete with sharp turns and serpentine twists, to the joy of the natives who have turned the city and county over to the visitors. The city of Chattanooga is in holiday garb and is thronged with motorists from all parts of the south. The mountain climb—you will insult the local club officials if you term the contest a hill climb—will begin Thursday afternoon at 1 o'clock and will continue until 5 or 6 o'clock. The course will be guarded by United States soldiers from Fort Oglethorpe and has been placed in perfect condition. Track races will be run Friday and Saturday afternoons, the program ranging from events at distances of from 1 to 50 miles. The following drivers are here practicing for the climb: Lambert, the White steamer expert; Lewis Strang, Louis Chevrolet and George Dewitt, the Buick team; Harry Tuttle and Bert Miller, the Stoddard-Dayton team; Arthur W. Greiner, the Chicagoan, with a Thomas six; Louis Doerhoefer, of Louisville, with a big Locomobile; D. D. Jones, of Atlanta, with an E-M-F, and Jimmy Ryall, with a Matheson. The following cars are entered by local owners or by drivers who have not yet arrived: Two Stevens-Duryeas, two Maxwells, Ford, Cadillac, Thomas, Chalmers-Detroit, Pope-Hartford, Pope-Toledo, White steamer, Premier, Locomobile, Buick and Studebaker. Strang has made the best time up the mountain, according to the clockers. There are sixty-eight turns in the 4.9-mile course.

ANOTHER FRANKLIN TEST

Syracuse, N. Y., April 19—Running for 50 hours without a stop of the engine or adjustment of any part, a 28-horsepower Franklin touring car was sent over the roads in and about Kingston, N. Y., at an average speed of 20 miles an hour, making a total of approximately 1,000 miles. The car was run to Poughkeepsie, Saugerties, Stone Ridge and various places in Ulster and Dutchess counties. The run was made by Clayton S. Carris and Albert Walmsley. It was in charge of Robert H. LaPorte, representing the H. H. Franklin Mfg. Co., and was arranged by Forsyth & Davis, the Franklin dealers in Kingston. After the car had run night and day for the time planned the engine was stopped. Only 45 gallons of gasoline and 10 quarts of oil were used.

LOWELL RAISES GUARANTY

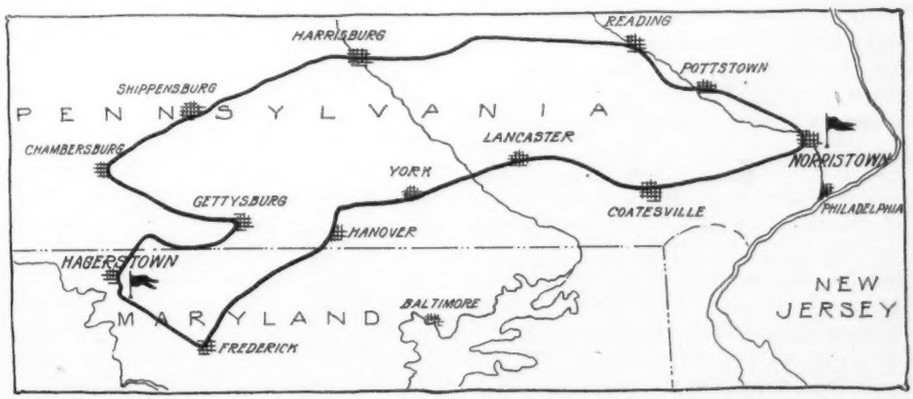
Worcester, Mass., April 18—That Lowell will have the A. A. A. national stock chassis race next June now seems assured. The $10,000 guaranty which the Lowell Automobile Club was called upon to raise to secure the race is assured, and all that now remains is to arrange the date of the race. President John O. Heinze, of the Lowell Automobile Club, will be in communication with the officials of the A. A. A. this week, and it is believed that there will be no difficulty in satisfactorily arranging the terms.

WORCESTER CLIMB CERTAIN

Worcester, Mass., April 17—The annual Dead Horse hill-climb will take place Saturday, June 12, 1 week later than last year. For several weeks the governors of the Worcester club have been considering the purchase of land on the west side of the city and building a hill of their own, but as negotiations have not sufficiently progressed to complete a road for a climb this year, it was yesterday decided to hold this year's climb on the Dead Horse hill course.

RUSSIA PROMOTING RUN

St. Petersburg, April 7—The Automobile Club of St. Petersburg and the Automobile Club of Riga have united for the purpose of promoting the longest reliability trial ever held in Russia. It will take place in July, the course being from this city to Riga and return, the distance being 1,200 kilometers, or 746 miles. It will be provided that every involuntary stop of motor or of the car will cause the car to be debited one point for every minute or fraction of a minute. Tire troubles will not be counted.



MAP OF THE ROUTE OF THE SECOND ANNUAL NORRISTOWN ENDURANCE RUN

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Are Stock-Car Contests Wanted?

DOES motoring America want stock-car road races, stock-car hill-climbs, stock-car reliability runs, stock-car Glidden tours and stock-car tests of other natures; or does it prefer open contests, namely those in which any maker can enter specially designed and constructed cars particularly intended for a certain style of contest? The car manufacturers as a unit apparently do not know what they want; one week a concern is demanding stock events and the next week it is calling for open contests. Many makers generally want what they have the best opportunity of winning and if they feel their regular stock product is superior to the stock product of rival makes they ask for the stock event; but on the other hand if their confidence in their stock product is not so great as it would be in a specially designed and constructed car then they cry for the open contest. If a maker wants an open contest that is all right; if he desires a stock contest that is all right; but under no consideration should any maker be allowed to enter anything but a stock product in a stock event nor should any motor club or organization be allowed to conduct a stock event in which machines other than strictly stock products compete.

A FEW examples will serve to analyze the situation: Last year in a road race a car entered as a strictly stock machine had one of its motor systems entirely altered, the fitting not being stock in principle. In the same race some cars carried larger radiators than are ever fitted to the machines when sold as stock to a buyer. In the same speed contest one contesting car used heavier wheels than fitted when the car is sold through agents. In another race the wheelbase was not of stock length, the front wheel bearings were not stock, the frame material was nickel steel instead of high-carbon steel, and many other examples could be cited. In the Glidden tour one make of car fitted heavier wheels than ever used previously on any of its regular cars; another maker used a new make of carbureter that was not stock; a third employed special steel in the springs; a fourth added a higher-priced magneto; and it was common gossip on the tour that any maker was foolish not to add special parts and use particularly better grades of steel in the cars for the test.

IT is an actual fact that many makers want stock car events and at the same time desire to evade the requirements and not put in strictly stock car parts. This is borne out by makers who actually refuse at times to fill out certain specifications asked for in entry blanks. Because a club conducting a race asks for the valve diameter and lift the maker refuses to give out such information on the ground that it is a factory secret. How can any technical committee decide whether a car is a stock car or not without knowing the valve diameter and lift? It is a fact that in several contests which are now only history valve diameters have been greatly increased in order to get higher motor speeds and the car has been passed on as a strictly stock proposition. Some manufacturers appear to think that cylinder bore, piston stroke, wheelbase, tires and number of speed changes are the only factors that are needed in a stock car; and that heavier wheels, larger tires, better materials, different bearings, different carbureter, larger oiling system, different gasoline system, larger radiator, faster fan, larger water pump and many other alterations are perfectly legitimate and should not be even considered in determining whether a car is a stock product or not. This is a grievous error and one that has already worked injury to the stock car status and robbed many contests of as high as 50 per cent if not higher of their actual value to the manufacturer. If it is to be a stock event make it one and then there will be a commensurate value to the buyer and the maker.

MANY makers claim it is most difficult for them to exactly define what a stock model is in view of the fact that they give a variety of options over the description given in the catalog. A few examples will show the scope of this optional situation at the present time: Manufacturer A. sells a car regularly listed with 34-inch wheels, but is constantly filling special orders with 36-inch wheels and not making an extra charge because of fitting the larger size. Maker B. regularly sells one model with 104-in wheelbase but will put on a 108-inch wheelbase when asked. Manufacturer C. regularly fits a gravity feed gasoline system but will give an option on a pressure-feed without extra cost, if the buyer demands such. Maker D. regularly supplies a 12-gallon gasoline tank but will fit up to 20-gallon without a penny of extra cost. Manufacturer E. will give different lengths of front springs according to the gear ratio, making the springs shorter if the car is expected to do fairly high-speed work. Manufacturer F. will give an option of any style of radiator that the buyer demands. Manufacturer G. agrees to furnish any make of carbureter at list price.

THE great consideration in determining whether stock or open events are of more value to a manufacturer is the effect of each on the public. These contests are conducted with the sole object of increasing the business, of selling cars, and keeping the motor car before the public; and the problem to decide is which line of contests is the more valuable in this respect. If Europe can be taken as an example, the open contest has not proved the most successful. All of Europe's road races were for special cars of a certain size, not one of which actual duplicates in the case of several firms was ever intended to be sold to the public. These events were not stock, and never advertised as such. They were always for the highest-powered cars, but, in spite of this, the high-powered car market in Europe is a drug today, compared with that of the small and medium-priced machines. In one or two European countries it is an accepted condition in the minds of the public that the regular stock cars of many racing concerns are not in any sense comparable with their racing creations, and it is also of interest that several of the biggest supporters of racing are today in the poorest condition financially, which would go to show that the policy of special racing cars is not the most beneficial to the manufacturer. In contrast with this are several European makers who have never entered in big road races, but are today the recognized manufacturers, are selling more cars than their rivals, and are in sound condition financially.

FROM this brief analysis it is reasonable to conclude that stock events will ultimately prove of more value to the industry than open events, but, before stock events will produce that value, they are capable of, the public must be led to believe that the cars contesting are really stock, and the situation must be impressed upon the manufacturers that they are stock and nothing else. If conditions are otherwise 50 per cent of the money and energy expended in such contests will be lost, and the industry will suffer at the same time.

ENTRIES PROMISED FOR CH

Many Manufacturers Promis To Support Western Road Ca nival in Indiana Next Ju

CHICAGO, April 21—Troops secured, the sanction granted and the course selected, the Chicago Automobile Club is now scouting for entries for the June road races. Frank H. Trego, general executive in charge of the carnival, is even now swinging around the circuit taking in trade centers in Michigan, Indiana and Ohio, interviewing the makers and securing from them promises of support. Trego went out Monday and so far his trip has been successful in that at Flint he received assurances that three Buicks will be named for the light car event and another trio of the same make for the Cobe cup, with Strang, Burman and Chevrolet as drivers. At Pontiac he was told there is a possibility of an Oakland being named for the Cobe cup. From that point Trego went to Detroit, where he expects to round up a number of cars. His first visit there was to the Ford plant, where he succeeded in interesting Henry Ford to such an extent that the manufacturer promised to enter two Fords in the light car race.

During the past week, since the entry blanks came out, interest in the two road races seems to have increased and each day brings out possible entries which hitherto have not been counted upon. The Stevens-Duryea bobbed up today, Louis Geyler, the local agent, declaring the company is considering entering one of its four-cylinder cars. The Renault people, too, are making their plans to enter a 20-30-horsepower car in the curtain-rais with George Schoeneck, a local star, driver. Two Knox entries are repor to be on the way here from Springfi Mass, while it is understood the Loco bile will be represented in both races, ting one in the light car event and in the Cobe cup. Two Moons are sai be slated, the entries being expected latter part of the week, when Stewart Donald comes to Chicago.

Pope Company Plans

Hartford, Conn., April 17—In the e of the sale of the Toledo plant of Pope Mfg Co., it is the intention o company to retire the issue of $266,0 the 6 per cent notes due August 1, and by appropriation of about $5 from the current earnings, the com will be able to take up the issue of 000 which matures August 1, 1909. action would leave earnings of $350,000 applicable to the two class stock in the event of the consumm of the sale of the Toledo plant t Overland company, which is now reg in this section as a foregone concl Naturally local interests desire to se

MOTORING EVENTS SCHEDULED IN UNITED STA

Chattanooga, Tenn., hill-climb, Lookout Mountain Automobile Club, April 22-23-24.

Commercial and industrial vehicle trials of the Kaiserlicher Automobile Club, Germany, April 23-May 13.

Roadability run, Philadelphia to Atlantic City, Quaker City Motor Club, April 24.

Second annual Fort George hill-climb, New York Automobile Trade Association, April 26.

Second annual carnival, New York Automobile Trade Association, April 26-May 1.

Pittsburg Gazette Times-Chronicle Telegraph 3-day endurance run, April 28-30.

Small car race in Sicily, Italy, April 29.

Endurance run, New York Automobile Trade Association, April 30.

Targa Florio road race, Sicily, Italy, May 2.

Third annual endurance run, 700 miles, Washington, Baltimore, Scranton, Motor Club of Harrisburg, May 3-6.

Small car trials of the Automobile Club of Austria, May 6-9.

Four-day endurance run, Detroit Automobile Dealers' Association, May 10-13.

Reliability run, Philadelphia to Pittsburg and return, Quaker City Motor Club, May 11-15.

Kilometer and mile races at Antwerp, Belgium, May 16.

Second annual endurance run, Norristown Automobile Club, to Hagerstown, Md., May 18-19.

Catalogne cup race, Barcelona, Spain, May 20.

Hill-climb near Stockholm, Sweden, May 22.

Two-hundred-mile endurance run, Hartford Automobile Club, Hartford, Conn., May 22.

Third annual endurance contest, New Jersey Automobile and Motor Club, May 22.

Hill-climb of the Automobile Club of Styria, Austria, May 23.

Moscow-St. Petersburg road race, May 26.

Endurance trials of the Automobile Club of Ireland, May 26-June 1.

Annual hill-climb, Giants' Despair mountain, Wilkesbarre Automobile Club, May 31.

Annual hill-climb of Cleveland Automobile Club, Cleveland, O., on Gates Mills hill, May 31.

Annual hill-climb of the Bridgeport Automobile Club, Bridgeport, Conn., on Sport Hill, town of Easton, May 31.

Start from New York of transcontinental contest for Seattle for Alaska-Yukon-Pacific Exposition, June 1.

Show of Barcelona, Spain, June 1-15.

Kilometer race and hill-climb at Montjeu, France, June 6.

Circuit, Provencal, Marseilles, France, June 6.

Commercial vehicle trials of the Automobile Club of Sweden, June 7-12.

Prince Henry cup tour, Germany and Austria, June 10-18.

Twent-four-hour track race, Quaker City Motor Club, Philadelphia, June 11-12.

Dead Horse hill-climb of Worcester Automobile Club, Worcester, Mass., June 12.

Catskill-Berkshire endurance contest, New York Automobile Trade Association, June 12-14.

Kilometer trials at Anse, France, June 13.

Scottish touring car trials, June 14-19.

Track meet of Bay State A. A., Boston, June 17.

Stock chassis race for Cobe trophy and light car race, Chicago Automobile Club, June 18-19.

Small car race, promoted by l'Auto of Paris, France, June 20.

Fourth annual endurance run, Albany, Boston, Hartford, Newburg, Binghamton Automobile Club, June 21-26.

Fifth annual tour, Bretton Woods, Portsmouth, Boston, Albany Automobile Club of Albany, N. Y., June 22-28.

Track race meet at Montreal, R. M. Jaffray manager, June 24-26.

Commercial car and military vehicle trials in Switzerland, June 24-July 5.

Straightaway races, Motor Club of Wildwood, Wildwood, N. J., July 3-4.

Southern California Automobile Dealers' Association, road races, July 4.

Endurance trials of the Automobile Club of Sweden, July 4-17.

Rochet-Schneider hill-climb, France, July 7.

Start of sixth annual A. A. A. tour from Detroit, July 12.

Motor week of Ostend, Belgium, July 13-17.

Agricultural motor-driven vehicle show at Amiens, France, July 17-26.

Meeting at Boulogne, France, July 18-20.

Annual speed trials of Salon, France, August 29.

Small car trials of the Kaiserlicher Automobile Club, Germany, August 29-September 3.

Mont Ventoux hill-climb, France, September 4-5.

Motoring Carnival of Lowell Automobile Club, Lowell, Mass., September 6-11.

Meet at San Sebastien, Spain, September 7-11.

Start of flag-to-flag endurance run from Denver to Mexico City, September 15.

Semmering hill-climb, Austria, September 19.

Kilometer trials and hill-climbs at Valladolid, Spain, September 27-30.

Gaillon hill-climb, France, October 3.

Commercial vehicle trials, Automobile Club of Austria, October 3-17.

Second annual stock chassis 200-mile race, Fairmount park, Philadelphia, Quaker City Motor Club, October 7.

Industrial and commercial vehicle trials of the Automobile Club of France, October 15-November 15.

Fourth annual midwinter endurance contest, Quaker City Motor Club, Philadelphia, December 29-30.

gued, and taxicabs must carry two pas-ngers besides the driver. The event will art at 1:30 o'clock from the Automobile ub of America, where all cars will be in-ected, weighed and furnished with 1 llon of gasoline. In addition to these zes, there will be a free-for-all prize to car traveling the greatest distance on allon of gasoline.

MOTOR PARKWAY AGAIN OPEN

New York, April 16—After being closed the motoring public during the past 2 ths, the Long Island motor parkway been again thrown open for use. Be-ning tomorrow the Meadow Brook e, near Garden City hotel and close he Meadow Brook Hunt Club, at West-, will be open on Saturdays and Sun-, between the hours of 8 in the morn-and 7 in the evening. As this one e only is open for the present, en-ce and exit can only be obtained at point. The roads of Long Island are od condition and are daily in use by ncreasing number of motorists who the wanderlust. Active construction on the parkway has been prosecuted g the winter. The right of way has, rge part, been cleared of excess trees rush. The work of grading, bridge ing, fencing and road making east Bethpage to Lake Ronkonkoma and from the Meadow Brook lodge to the s-Nassau line is being organized, and n a short time gangs of laborers, con-mixers and steel workers will mingle the surveyors and engineers who have ed during the entire winter. The ects for active work and rapid con-struction are excellent. The reinforced concrete road surface, 22 feet wide and 11 miles long, has withstood the action of the elements, and is in as excellent con-dition as when completed.

HARVARD INTERESTED

Boston, Mass., April 19—Harvard students who are motorists have decided to put up a trophy for a race at the Bay state meet on June 17, which is to be known as the Harvard trophy. This event will be at a distance of 25 miles. As yet no rules have been considered for it, but it will have to be a handicap event of some sort. According to the tentative plans of the race committee of the Bay State A. A., there will be some five events. One of these, it is expected, will be a 10-mile free-for-all. Another will be a match race of some sort. Chester I. Campbell has been asked to accept the position of chairman of the race committee. This means that there will be no race manager as in former years. There is some talk of a race meet at Providence under the auspices of the Rhode Island A. C. Memorial day, and if it materializes a large delegation of the Bay state members will go to Providence to help along the sport and invite the Rhode Islanders to come to Boston 2 weeks later to the Bay state races.

NEW YORK AWAITS CARNIVAL

New York, April 19—Plans of the various committees in charge of the New York carnival, which opens next Monday and lasts through the entire week, are rapidly materializing and there is every indication that the event will be a record-breaker. The affair will cover every phase possible of motoring—parades, hill-climbs, speed trials and an economy test.

The hill-climb will be at Fort George on Monday and with one minor exception the price classification will be the same. There also will be a free-for-all, steam and electric classification. The straightaway races undoubtedly will take place on Hillside avenue, Jamaica, while on Friday there will be a 1-gallon economy test which has been decided upon in place of an endurance contest. The economy affair will be opened to all types of gasoline, steam and electric stock cars. There will be seven classes—for cars selling for $850 and under, $851 to $1,250, $1,251 to $2,000, $2,001 to $3,000, $3,001 to $4,000, $4,001 and over, and a special class for taxicabs. The price classification is the one recently adopted by the Manufacturers' Contest Association, and under which all contests sanctioned by the American Automobile Association will be conducted in 1909. Each car must carry its full quota of passengers as cata-

ANALYSIS OF TARIFF

E. P. Chalfant, General Manager of A. L. A. M., Points Out Motoring Features of Bill

New York, April 19—The American manufacturers who use foreign material in their cars should read with interest the amendments which the senate finance committee has made to the Payne tariff bill. A careful analysis of this matter has been made by E. P. Chalfant, general manager of the Association of Licensed Automobile Manufacturers. Paragraph 140 of the Payne tariff bill, which read: "Motor cars and parts thereof, bicycles and parts thereof, and motor cycles and parts thereof, 45 per centum ad valorem," now reads, as amended by the senate committee, as follows:

"Motor cars, bicycles, and motor cycles, and parts of any of the foregoing, including tires, axles and ball-bearings, 45 per centum ad valorem." In all probability this amended paragraph, if enacted, would be interpreted by the customs officials to mean that all and any parts whatsoever of a motor car should pay a duty of 45 per cent of their market value abroad, whether or not there were in the tariff act provisions which would otherwise designate lower duties for parts of motor cars. This has always been the principle proceeded on by the government where a special classification, as in the case of said paragraph 140, is made; taking the higher duty.

It is probable that in this situation the already large amount of litigation between importers and the government, would be greatly added to. For example, there appears to be some doubt whether an unfinished forging or casting should pay duty as a motor car part or as a forging or casting per se, in which latter event the duty would be much less.

Section 127 of the present Dingley tariff law imposes upon forgings of iron or steel, of whatever shape or of whatever degree or stage of manufacture, a duty of 35 per cent ad valorem. Section 121 of the pending tariff bill, which is proposed to supersede the last mentioned section, imposes a duty of 30 per cent ad valorem on forgings when, and only when, not machined, tooled, or otherwise advanced in condition by any process or operation subsequent to the forging process.

Paragraph 148 of the present Dingley tariff law, referring to castings, reads: "Castings of iron not specially provided for in this act, 8-10 of 1 cent per pound."

Paragraph 146 of the proposed tariff law reads: "Castings and vessels, wholly of cast iron, valued at not more than 2 cents per pound, ½ of 1 cent per pound; valued at more than 2 cents per pound, 35 per cent ad valorem. All castings of iron, or cast iron plates, which have been chiseled, drilled, machined, or otherwise advanced in condition by processes or oper-

ations subsequent to the casting process, but not made up into articles, shall pay 2-10 of 1 cent per pound more than the rate imposed on the castings of iron and cast-iron plates hereinbefore provided for."

Taking gas engine cylinders as an illustration: Assuming the cast-iron cylinders of an ordinary four-cylinder engine, weighing 250 pounds, cost 10 cents per pound, the duty under the present Dingley tariff law is, at 8-10 of 1 per cent per pound—$2. Under the proposed law, these cylinders would, if classified as castings—valued at more than 2 cents per pound—be assessed, the foreign market value remaining the same, $8.75; the rate of duty under this classification of the current act being 35 per cent ad valorem.

The duty on purely unfinished forgings is reduced in the Aldrich amendments 5 per cent. But the duty on any forgings upon which any work at all in addition to the mere forging has been done, is increased 10 per cent. Fully finished forgings are assessed, as motor car parts, 45 per cent ad valorem. That is, the policy of protecting American labor, insofar as the finishing work on forgings and castings is concerned, has been adhered to.

MANY AFTER PRINCE'S CUP

Berlin, April 8—The Prince Henry tour will be a success. In fact it may be said it probably will be a bigger success this year than any of the previous big tours promoted by the big German club. At 6 p. m. April 1 there had been received at the headquarters of the Kaiserlichen Automobil Club 111 entries, each being accompanied by the regulation entry fee of $125. Thus already $13,875 have been collected and the chances are that by May 1, when the entries at double fees close, that the sum total will not be far from an even $15,000. Cars from four foreign countries have been entered, which will lend it an international aspect, which always is desired in Germany. Of the 111 cars entered there are ten from Belgium, six from Austria, five from Italy and four from France. Among these foreign products are some of the best known in the world, such as Fiat, Itala, Bianchi, Austrian Daimler, Berliet, de Dion-Bouton, Laurin-Klement, Pipe, Metallurgique, Germain, Minerva. As for the German cars there are entered thus far seventeen Opels, twelve Benzes, nine Mercedes, seven Horchs, six Adlers, four Gaggenaus, three Deutzes, four Protos, three Neckersulms. Nor will the tour lack in the support of the nobility. Going through the list one finds five counts, six barons, two chevaliers and lots of vons. Among the well-known drivers who will be seen at the helm of some of the cars are Willy Poegge, to drive a Mercedes; Fritz Erle, in a Benz; the Opel brothers, who all will be driving Opel cars, of course, and Theodor Dreher, the Viennese banker, who has not as yet lost a Semmering hill-climb contest.

FACTS ABOUT BIG RUN

Statistics Are Compiled by Maxwell People on Recent 10,074 Non-Motor Stop Test

Boston, Mass., April 17—Manager Frank J. Tyler, of the Boston branch of the Maxwell-Briscoe company, is now awaiting patiently the report that Professor Charles F. Park, of the Massachusetts Institute of Technology, will make as to the condition of the materials in the car after its non-motor stop run of 10,074 miles completed last week. Mr. Tyler gave out these figures as official yesterday relative to the run:

Motor's total running time	606 hours 21 minutes
Car standing still	39 hours 40 minutes
Miles run	10,074
Gasoline consumed	758 gallons
Oil used	119 gallons
Grease used	17 pounds
Water used—until 4,792 miles was covered—None	No record
Tire troubles	8 punctures, two new shoes
Mechanical troubles— Changed 1 spark plug, 1 push rod, 4 spring leaves and altered rear axle bearing	
Cost of gasoline at 15 cents per gallon	$113.70
Cost of oil at 75 cents per gallon	89.25
Cost of grease at 15 cents per pound	2.50
Punctures at $1 each	8.00
Mechanical expenses	12.00
Total cost for 10,074 miles	225.45
Cost per mile	2⅓ cents
Average number of miles to gallon of gasoline	13½
Round trips from Boston	156
Average mileage of each trip	65 miles

On the run there was used 758 gallons of gasoline, 119 gallons of oil and 17 pounds of grease. This is a much larger amount than really was necessary, much more undoubtedly than any private owner would use on a trip of the same length, but there was no sparing of expense. Yet in spite of the free way in which oil and gasoline were used the car averaged 13½ miles to the gallon of gasoline from start to finish, stopping time included. Though 606 hours were used on the trip, carefully compiled figures show that the car was standing still, with the engine running, just 39 hours 40 minutes, equal to nearly 600 miles, figuring on the average made on the road. This time was used in taking on gasoline and oil, changing drivers and observers, changing tires, broken springs and a rear axle. The latter was made as a precautionary measure, found afterward, however, to have been wholly unnecessary. It was made on account of the fact that some grit got into the brake bearing as a result of a lost grease cup early in the run. This, however, was the only new part put on the car, except springs, and the only work done on the motor from start to finish of the run was the changing of one spark plug, and the putting in of a new exhaust push rod in the front cylinder, rather a delicate task, with the engine running, but performed cleverly by C. W. Kelsey. This sums up the amount of work done on the car or engine from start to finish. There were in all eight tire punctures or blowouts, one tire having run more than 7,000 miles and another a bit more than 8,000 miles. Until after 4,792 miles had been covered no water was put in the radiator, and after that it was seldom used. There was, in fact, a surprisingly small amount of water used on the whole trip.

Six Ajax tires were all that were used, four of which were on the car at the finish and declared to be in perfect condition. Had it not been for the fact that demountable rims were used and inflated tires carried in order not to lose time in case of puncture one set doubtless would have sufficed. One of the tubes ran 7,492 miles on its original inflation.

MARYLAND WAIVES FEES

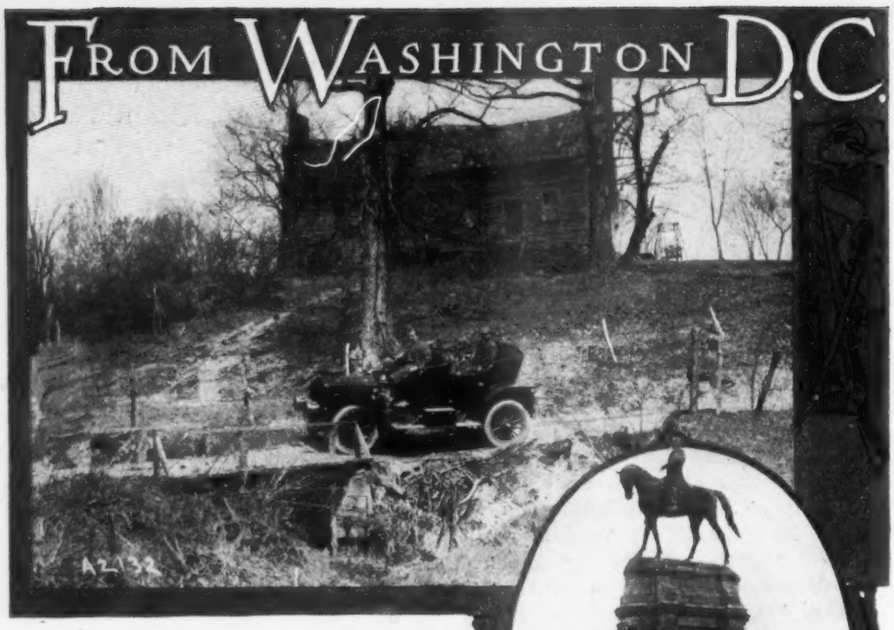
Baltimore, Md., April 17—The request of the Automobile Club of Maryland that members of the Motor Club of Harrisburg, which is to hold an endurance run on May 5 and 6 from Harrisburg, through Washington, Baltimore, Hagerstown, Westminster to Scranton, be permitted to pass through this state without taking out the Maryland license usually required, has been granted by Secretary of State N. Winslow Williams, after a conference with Governor Crothers. The visitors, however, have been informed that they will be subjected to all the other state laws and regulations. The members of the local club will shortly promote a similar run into Pennsylvania and will ask the same concession of the Pennsylvania government. The members of the local club are making preparations to entertain the Harrisburg motorists in the tour through Pennsylvania and Maryland. On the second day's trip, when the tourists are on their way from Washington to Baltimore, bound back to Harrisburg, a party from the local club will meet the visiting motorists near Relay and escort both the pilot and chairman cars to Baltimore. The checking station will be at the club headquarters, where the members will be supplied with coffee and sandwiches.

HORN NOT NECESSARY

Worcester, Mass., April 18—A matter of wide discussion in the rooms of the Worcester Automobile Club recently was the discharge of Alvin Burlington by Judge Murray in Boston April 10, the judge ruling that a horn was not needed in running a motor car. Burlington was charged with running his motor car without this equipment. Judge Murray said that a chauffeur could cut out his muffler at any moment and make enough noise to warn whom it might concern. Edward M. Warren was in court, with others, on a similar charge. He was let go, but it appeared that he did not wear his badge conspicuously and this was made the basis of another charge. Warren explained that he used his badge to hold up his trousers and also that he had showed it to the officers, but Judge Murray found him guilty. Warren, at last accounts, was using suspenders.

From Washington D.C.

THERE was a time when the attention of millions of people was focused on the problem of how to reach Richmond, Va., from the north. In fact, it was not until after 4 years of fighting and after tens of thousands of lives had been sacrificed, that the union troops entered the capital of the confederacy. In these days, the trip from New York to Richmond may be made by motor car in 3 or 4 days, the task of the motorist being no more difficult than is offered in covering any neglected road through a sandy and hilly country. Unlike those traveling to Richmond in the dark days of 1861-65, the motorist need not worry about his bases of supplies, because he can get food and shelter at any farm house, gasoline at almost any cross-roads store and motor car supplies and accessories at stations located not more than 125 miles apart. These assurances we can give as the result of a recent tour from New York to Richmond in a 30-horsepower White steamer.



DESERTED HOUSE NEAR ALEXANDRIA

STATUE OF GENERAL LEE IN RICHMOND

From Washington to Richmond

Of course, the most interesting part of our tour was that between Washington and Richmond, but even before we reached Washington, we went over a route which is known to comparatively few motorists. Leaving New York on the evening of Good Friday, we drove as far as New Brunswick, where we spent the night. The next morning, we hustled over the road to Trenton and here, crossing the river, drove into Philadelphia by way of Bustleton. This route proved to be much more interesting than the usual route via Bordentown and Burlington and, besides, we avoided the ferry at Camden and the narrow east-and-west streets of Philadelphia. Coming into the city by way of the Old York road and North Broad street, we stopped only long enough to have luncheon and then continued straight out South Broad street. Chester was the next town on our route and we found the roads south of that place sadly neglected.

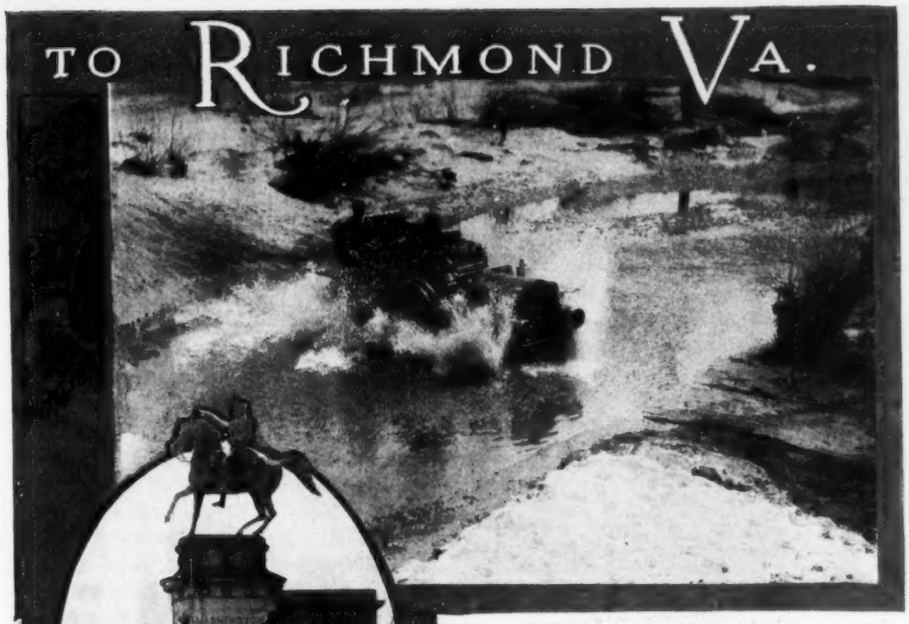
GLADES AND GLENS APLENTY BETWEEN BELAN AND BALTIMORE

Pathfinder Describes Direct Route From

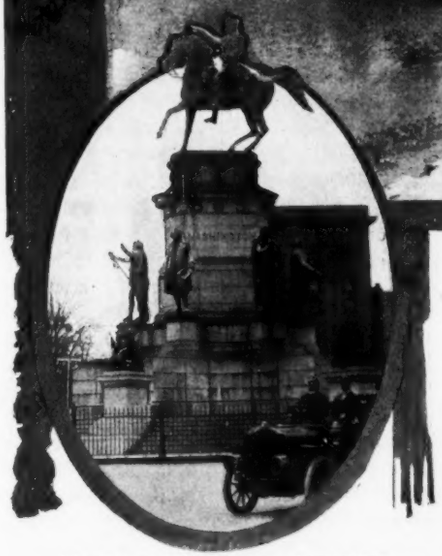
As soon as we crossed the state line from Pennsylvania into Delaware we found much better roads, which continued as long as we were in Delaware and well into

TABLE OF DISTANCES

0	Ferry, to Staten Island
60	Trenton
79	Bustleton
96	Philadelphia
124	Wilmington
138	Newark
146	Elkton
161	Havre de Grace
176	Bellair
198	Towson
207	Baltimore



SOUTH OF FREDERICKSBURG



WASHINGTON STATUE IN RICHMOND

New York City to Picturesque Richmond

Maryland. We passed through Wilmington, the principal city of Delaware, then through Newark, and Elkton, Md. This section of the country was settled very early in colonial days and we passed many fine old homes and churches, dating back to early in the eighteenth century. Soon after leaving Elkton, the good roads stopped and the road became rather rough with occasional stretches of sand. Continuing through Northeast and Principle, we reached the Susquehanna river at Perryville, just as it was getting dark.

Ferried Across River

The ferryboat happened to be on that side of the river and it was not long before we were landed at Havre de Grace on the other side. There is a decent pier and the ferry charge is $2.

Starting about November 1 next, the ferry at Havre de Grace will be a thing of the past. The Pennsylvania railroad has recently built a new bridge at this point and has ceded its old bridge to the state. As soon as a new center pier is completed, there will be a fine highway bridge for the use of vehicles. At the present writing, the first highway bridge over the Susquehanna river is at Columbia and the majority of tourists traveling between Philadelphia and Baltimore go that way—probably because there is a tradition that the direct route via Havre de Grace is very difficult. It is true that the road from Elkton to Havre de Grace is bad in wet weather, but I do not see why any one with a good touring car should hesitate to go over that road in pleasant weather.

We spent the night very comfortably in Havre de Grace at the Harford hotel. Before starting in the morning, we were joined by L. W. Tremblay, of the Maryland Automobile Club, who acted as our guide as far as Washington. We had not traveled far from Havre de Grace when the good roads commenced again and we made quick time through Belair and then to the beautiful Long Green valley, famous as the rendezvous of several hunting clubs. We left the valley at Towson and it was but a short drive over the hills

FROM NEW YORK TO RICHMOND

218	Elk Ridge
242	Hyattsville
250	Washington
257	Alexandria
273	Occoquan
284	Dunfries
301	Stafford Court House
312	Fredericksburg
357	Ashland
375	Richmond

IN THE VALLEY OF THE OCCAQUAN RIVER

PATHFINDER ENCOUNTERS A LONE FISHERMAN NEAR OCCAQUAN

into Baltimore—111 miles from Philadelphia.

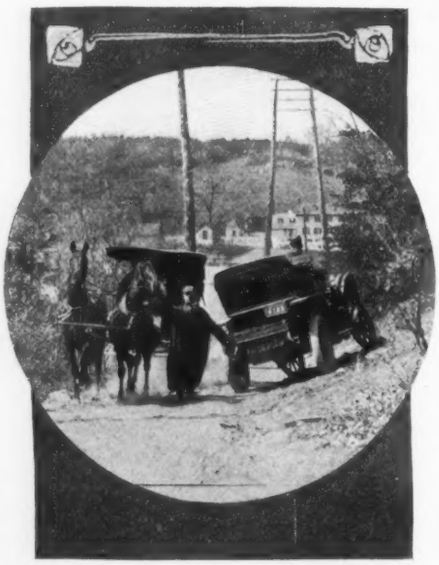
Other Way Round-About

Until last autumn, tourists usually made the trip from Baltimore to Washington by a round-about way via Ellicott City. Now a fine boulevard is under construction directly connecting the two cities. The distance over the new road is but 42 miles, approximately the same as by rail. More than two-thirds of this road has been finished and it is probable that before the summer is over the work will be completed.

Less than 2 hours after we left Baltimore, we sighted the top of the Washington monument. Just as we were nearing the limits of the District of Columbia, we saw a motor car approaching us at a speed very much greater than that stipulated in the statute. As it went by us we saw that it was a White steamer in which sat its smiling owner, President Taft, with the members of his family. He acknowledged our salute by tipping his cap with that display of camaraderie which is usual when White meets White.

Pass Night at Washington

We decided to spend the night at Washington and devoted much of the evening to considering our further plans. We had left New York without any more definite plan than to start toward Washington and to spend about 3 days on the road. Having reached the capital in practically 2 days, we determined to continue southward in an endeavor to reach Richmond in a day. We had at that time no data to guide us. The only map of Virginia which we had was a Rand-McNally railroad map. We determined to travel due south and, unless we received very specific recommendations to the contrary, to take whatever road was the shortest. We knew that we would probably have bad roads, no matter what route we followed, and, therefore, that the shortest route would prove the most desirable.



GIVING THE RIGHT OF WAY

Virginia, in the early days of the country justly termed the Mother of Presidents, has fallen from its former position of leadership and now it lags behind the adjacent states in industrial development and in the building of roads. To the north is Maryland, sharing in the industrial development of the northern states and, like most of its neighbors to the north, giving state aid to good roads. On the other side of Virginia is North Carolina, leading in the development of the new south and building, county by county, a network of splendid macadam roads. Virginia is backward commercially, backward in good roads building. We have at various times toured in several sections of the state and the only decent road we have seen is the Shenandoah valley pike.

But let us not despair of Virginia. Just as we were leaving the hotel in Washington on Monday morning, we met one of the congressmen from Virginia and we learned from him that there is a strong movement in his state to start the good roads development by building a macadam highway from Richmond to Washington. The road to be improved is the old telegraph road along which the telegraph wires are strung between the two cities. This telegraph road, we learned, was the route over which the mail coaches traveled in the days before the railroad and it is the most direct between the two cities. It was the road therefore for us to take in conformity with our plans for going by the shortest possible route. Besides, if a pathfinder cannot discover good roads, he should take the route to be improved.

Crossing Potomac River

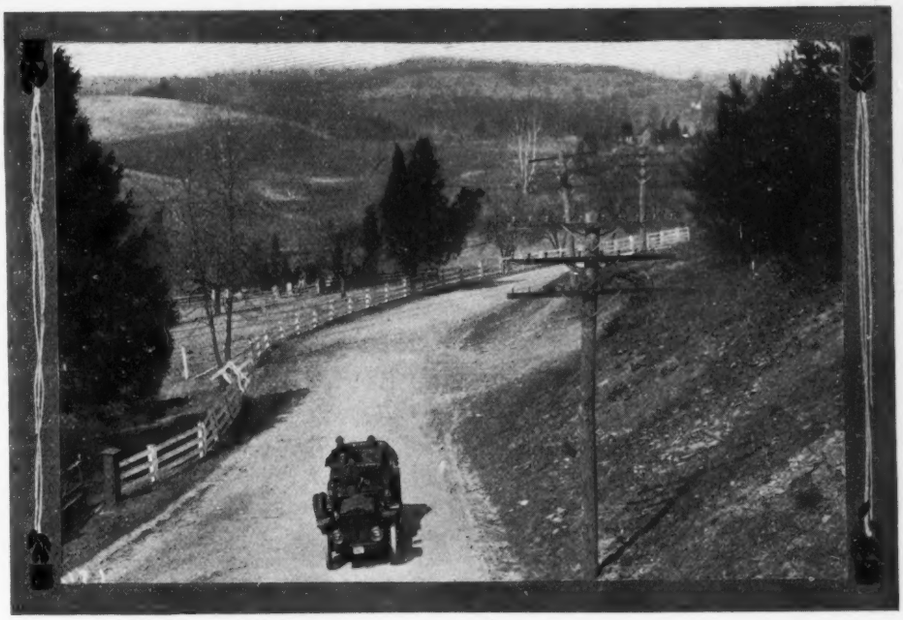
From Washington, we crossed the long bridge over the Potomac river and continued parallel with the railroad into Alexandria. On the outskirts of this town we turned off to the left, from what seemed to be the main road, onto the tele-

OLD COLONIAL HOUSE AN WILMINGTON, DEL.

graph road. We followed this road practically all the way to Richmond, making only two short detours at places where we were advised that we would find much better road conditions by so doing.

Nothing would be gained by considering the telegraph road section by section. Almost all of it is bad and much of it is worse. There is very little level country in eastern Virginia and the road goes up and down, up and down. The best roads which we found were of sand, on which, by straddling the ruts and by opening the throttle a little wider than usual, we made very good progress. In many places, the road was rough and washed out and often each of the four wheels would be on a different level. We found many miles of corduroy roads in which the corduroy was missing every few yards. After dropping from the corduroy, we would bring the car almost to a stop at the point where the corduroy began again. Then opening the throttle wide, our car would climb onto the new level—8 to 10 inches above the old—without even jarring the passengers. But, of course, this kind of driving takes time and instead of reaching Fredericksburg, the half-way point, in time for luncheon, as we had planned, we had traveled by 1 o'clock only as far as Stafford Court House, 52 miles from Washington.

Stafford Court House consists of two general stores, a one-story court house, a jail and a fine old-fashioned farm house owned by the clerk of the court. After being provided with a bountiful meal, we were invited to inspect the records of the court, which go back to 1662. The records are as legible as if written only a few years ago and we read the story of some of the old litigations without diffculty. We were particularly interested in the case of the six Indians who, in 1675, were haled to court to answer to the charge of killing a man's horse. Having been found guilty they were sentenced to pay to the owner, as indemnity, "one thousand arms' lengths of round oak."



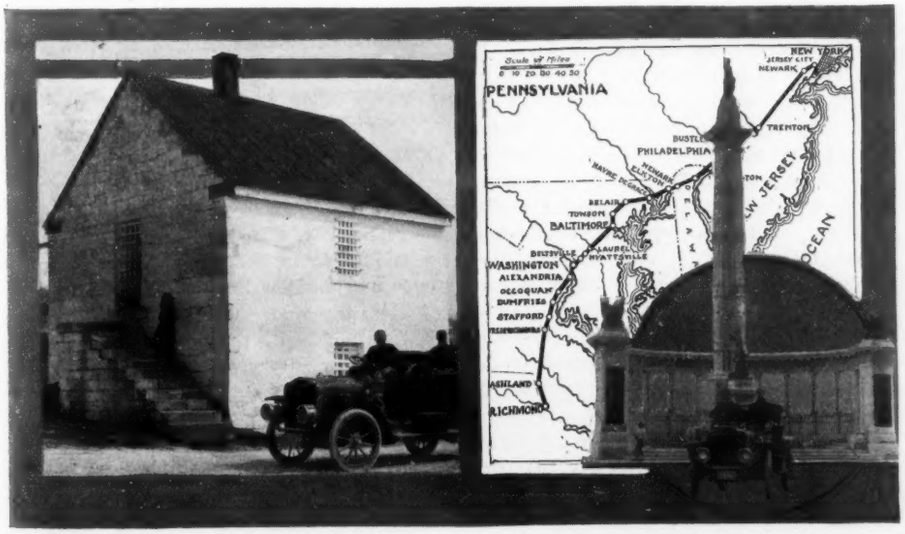
In the Beautiful Long Green Valley, Where Good Roads Are Found

Typical Virginia Road

After leaving Stafford Court House, the road improved a little and we crossed the Rappahannock into Fredericksburg. On the summit of the hill just beyond this town, we saw by the roadside a little monument, hardly 2 feet high, bearing the inscription, "Lee's Hill, Battle of Fredericksburg." This seemed to us to be indeed a modest memorial to the valor of the confederate troops.

After leaving Fredericksburg, the roads seemed even rougher than before. There were more creeks to be forded but none of them were very wide or very deep. In fact, considering how sparsely the country is settled, we were a little surprised to find substantial iron bridges over the more important streams. From Fredericksburg, we drove south more than 40 miles without seeing anything that could be called a town. Even the houses were a number of miles apart. This section is certainly not to be recommended to tourists who have not the confidence in their car.

About the time our speedometer showed that we had traveled 95 miles from Washington, we found ourselves on a comparatively good road. Ten miles further along, at the little town of Ashland, the first we had seen since leaving Fredericksburg, we stopped to light our lamps, as daylight was almost gone. We could not get our acetylene lamps working but, as the road was steadily improving, we continued toward Richmond by the light of our oil lamps. We reached Richmond in time for a late supper at the luxurious Hotel Jefferson, 125 miles from Washington and 375 miles from New York. Thus without a single involuntary stop, even for tires, we had traveled from the metropolis to the old capital of the confederacy in practically 3 days and had passed through five states—New Jersey, Pennsylvania, Delaware, Maryland and Virginia.



Jail at Stafford Court House

Jefferson Davis Memorial

ELIMINATING DUST A SCIENTIFIC PROBLEM

BOSTON, MASS., April 19—One of the problems that was solved by the Massachusetts highway commission in connection with the use of motor cars was that of eliminating the dust. When the cars became numerous they created much dust and this was swept along before the wind and deposited in houses and fields. The old method of watering did not produce satisfactory results, for it dried up too quickly under a warm sun, so recourse was had to other materials.

However, it must not be understood that all the roads of the state are dustless, or will they be for many years to come. But with state, cities and towns working together along parallel lines the evil will be gradually lessened as the years go by. For example, to lay the dust properly it costs several hundred dollars per mile, according to the material used and the conditions of the road, and as some of the towns in the state get but $250, more or less, for both construction and repair work, which is in some cases less than $25 a mile, naturally such places cannot tackle the dust problem, except in the old way with water.

Helping the Towns

The highway commission recognized the handicap that many towns were laboring under, and it has suggested to the legislature that a bill be passed enabling places to use something other than water, and to provide that the entire cost, or a portion of it, may be assessed upon the abutters when any road is treated with such materials. A special act was passed last year allowing New Bedford to do this, and it worked out satisfactorily.

When the problem of dust laying is considered, with it must also be classed the one of preserving the roads, for the two go hand in hand. It has been found that it is a good plan to work on the two together, for the oils used in laying the dust have been found to be good for the surface of the roads.

During the past year more than 45 miles of state highway were treated with various materials for eliminating dust and preserving the surfaces. This is, of course, but a small percentage of the roads under the supervision of the commission. In fact the total mileage now of state highways comprises 740 miles. When the entire plan is completed there will be about 1,800 miles. Yet this is but a small part of the highways in the state. Eventually, however, when the experiments now being conducted to find a solution for the problem to keep roads from being unraveled by traffic are completed, many miles of highway will be treated and the expense of maintenance that is now running so high will be reduced materially.

In its experiments last year the commission had 23 miles treated with Texas oil, at a cost varying from 5 to 7 cents per square yard. Liquid asphalt was used on 10.22 miles, at a cost of 6¾ cents per square yard. Tarvia B was used on 2.20 miles, at a cost of about 4 cents per square yard, including covering. Rotar was used on 1.2 miles, at a cost of 5¾ cents, and asphaltoilene was applied to 1.5 miles, at a cost of 6 cents per square yard.

Cleaning Road Surfaces

The processes, in general, were substantially the same, and consisted in cleaning road surfaces of all dust down to the stone, spreading the bituminous materials, in some cases cold and in others hot, according to their consistency, allowing them to soak for a time, then covering with sharp sand or gravel, or stone screenings, to absorb the surplus material, and to provide a wearing surface upon the road. The price varied according to the haul and other local conditions, the bituminous materials being nearly uniform in price.

Judging by the experiments of 2 years, it can be said that these various materials lay dust very satisfactorily and prevent roads from raveling to a great extent. The roads have raveled in places and this has been due, in the opinion of the engineers and other observers, to the fact that there were dust pockets, or places where the material used did not penetrate to the stone beneath, or the stone not being thoroughly compacted, and being loose so the top surface therefore scaled off. If the patches that have scaled are not treated very soon large depressions quickly form where there is much motor travel.

In general, with any of the bituminous materials mentioned, satisfactory results were obtained if sufficient care was used in doing the work. The effect of these treatments has, so far, in some places largely disappeared by the following spring, but where a road was in proper condition it has prevented any serious raveling during the season.

Beverly Tries Calcium Chloride

Calcium chloride was used upon 4 miles of state highway in Beverly, being paid for by the residents upon the shore. It laid the dust in a very satisfactory manner and somewhat preserved the road surface. It worked better than proper watering would have done. The road has developed some small holes and depressions, and has had to be repaired twice during the year, and small quantities of stone added, although it is only from 2 to 3 years old. Motor and team travel is very heavy on this road. During the season of 5 months six applications of chloride were put on and the cost for the spread of the cart, about 17 feet wide, was $289 a mile for the season.

Oil emulsion was used upon a mile of state highway in North Beverly that had been resurfaced. The treatment was started late in the season, so that it was impossible to get the cost for the year. A soft naphtha soap was used to emulsify the oil, 20 pounds of soap being mixed by an ordinary pump with 50 gallons of water and 100 gallons of Texas oil. The emulsion was then put into a watering cart, the water turned on from a hydrant, under pressure, with a hose pipe until the cart was filled, and then the mixture was immediately spread upon the road. It was found that with one watering cart of 600 gallons capacity about ⅕ mile of road could be covered, and that the materials cost $30 per mile for each application for the spread of the cart. As there was considerable dust upon the road a second application was necessary within a week, and a third about the end of a month, but the dust was satisfactorily laid for about 3 months, or until the snow fell.

Several Applications a Year

Both calcium chloride and oil emulsion require several applications during a year, probably from four to six, to produce satisfactory results, and with calcium chloride the road has to be watered once a day during the dry season; but speaking generally, the results produced are much better than those obtained when ordinary watering carts and water are used, and the expense is no greater than the cost of watering, because one cart can take care of as many miles of road as three carts can when water alone is used. The saving in cost of teaming will just about pay the cost of the calcium chloride. The chief advantage in the use of this chemical is in the fact that the dust is satisfactorily laid during the whole day of 24 hours. The same is true of oil emulsion probably, but neither of these materials nor the ones mentioned above are more than temporary dust layers and road preservatives, as the effect is almost, if not entirely lost by the following spring.

A number of cities and towns in the state are taking up the problem of using oils instead of water for their roads and the highway officials are now frequently communicating with each other relative to the problem. The fact that it has been less expensive to use oils has awakened much interest.

New Bedford Statistics

One of the interesting sets of figures furnished the highway commission recently came from New Bedford. The street commissioner there treated 27 miles of road once and 8 miles twice. It made a practical average of 45 miles treated to one application, and it was figured out that the cost per mile was $176.84. In that city an oil was used and the results were generally satisfactory.

The metropolitan park commission had something between 25 and 30 miles to care for during the past year and according to its latest figures the cost for oiling or what is called surfacing averaged about 5

cents per yard. The 3 miles from Mattapan square to Canton avenue cost 6⅝ cents per square yard, while the 5 miles along the Lynn shore was done for 2 cents. In Middlesex Falls the retreatment cost 4½ cents, while sections along the Revere beach boulevard averaged 5 cents a yard.

Boston Studies Problem

The Boston park department had 43 miles to look after and the commissioners started out early to lay the dust on their roads and succeeded in doing it admirably. A mixture of Texas oil with asphaltum base of 200 gallons together with 50 gallons of hot water and 40 pounds of soap were dissolved and agitated by a steam pump. When it was thoroughly mixed it was fed into carts. The cost for this averaged $323.84 per mile. A fine sand was spread on first and the oil poured over this. The sand held the oil and the traffic rolled it down and prevented the suction by motor tires to some extent and also prevented the formation of a hard, slippery crust on the macadam.

In Franklin park this was only used once in 20 days, so the cost there was only $119.68 per mile. On the other hand, Commonwealth avenue had to to be oiled once every 10 days at a cost of $719.84 per mile of 30-foot roadway. The cost last year averaged $352.67, so this year it is less, showing how the cost decreases annually.

Street Commissioner Ross, of Newton, has probably made greater advances in eliminating dust than most of the men in other cities of the state. The city has been generous in advancing money for experimental purposes with splendid results. There are several streets in Newton today, some of them hillside thoroughfares, which in the prevailing high winds of this season are as dry as if they had been freshly surfaced and rolled with a steam roller. None of them has been treated with any dust-laying solution since early last fall and some of them have retained the hard, dry surface for 2 years without any attention.

Last fall Mr. Ross with some of the experts from the United States agricultural department in Washington made several experiments with streets. One preparation used was a combination of molasses, lime and oil mixed with a small amount of cement. Today a pickax can hardly dent it, despite the severe winter storms, and there is practcilly no dust from it.

Bill in Legislature

So if the bill now before the Massachusetts legislature allowing cities and towns to use oils and other materials becomes a law it will mean the elimination of dust in many places throughout the state. It is conceded generally now to be cheaper and more effective than water. It is a good beginning for the Bay state and other states are sure to take up the problem when they find what splendid results have been achieved.

SEES NEED OF ROADS

Northeastern Ohio Realizes Great Benefits Secured by Proper Drainage Systems

Toledo, O., April 17—Never in all its history has there been such a general awakening among the people of northeastern Ohio as to the substantial benefits to be derived from proper road and drainage systems as at the present time. Thousands upon thousands of dollars of bonds are being issued for the purpose of carrying on this great work to the best advantage. Williams county is the one exception to the general rule in that it never has issued bonds for road improvements and is probably the only county in Ohio that has not one dollar of bonded indebtedness. Whether this is a matter of which to be proud is at least debatable, with the large preponderance of opinion in favor of the negative. On the other hand some counties have entered into the spirit of this work to an extent that might almost seem to be extreme; but those who have assumed the obligation and paid the bills contend that it has been not only a source of great satisfaction but a matter of actual dollars and cents.

A striking illustration of the benefits derived from road building and drainage is that of Paulding county, which has issued more than a million dollars of bonds for road improvements alone. In speaking of this matter County Auditor Floyd Atwell recently said:

"I do not believe that there is another county in all this grand domain of Buckeyedom that has made better strides for the advancement of the interests of the people. Our road building has not been on the experimental plan but from actual experience. Road building was begun in 1882 on what was termed 'improved roads'—simply grading and drawing up. For such work the county between 1882 and 1892 issued bonds in the sum of $124,000 and paid interest thereon of $33,000, which money if at that time had been placed in stone or gravel roads would have been a permanent improvement. It soon became evident the soil of this county was too rich to sustain such roads and in 1898 we started the stone roads, with the result that in 10 years we have built and now use nearly 500 miles of good roads.

"Did it pay? Lands that were selling 10 years ago for $15 to $50 per acre are now selling rapidly for from $50 to $150, and good roads was a prime factor in the upward price movement as well as the productiveness of its soil. The county's duplicate shows a taxable value of real and personal property of $7,348,954, while our neighboring county of Williams has more than a $10,000,000 duplicate; a quarter of a million dollar court house, poor roads and lands that sell for considerably less than Paulding county lands. Indebtedness is not a thing of which to boast, it is true, but with all the indebtedness of this county created by the things actually necessary for its advancement, it must be remembered the parties that pay the indebtedness are each year reaping the benefits in much better crops and better facilities in marketing them.

"In 1880 Paulding county was in regard to population the smallest in the state; in 1890 it was ahead of twenty-seven other counties and is still climbing. In 1880 the county was practically a swamp with timbered lands that could be bought for $5 per acre. The population, as small as it was, woke up to the fact of the necessity of drainage and went at it by bonding the county. The result was that in a few years wonderful crops began to attract the other fellows, who, with sagacity for its future development began to drop in and buy a tract here and there so the smallest county in the state in 1880, with its swamps and frogs, has by heroic effort and unblemished credit risen to be one of if not the best agricultural county in all this northwestern country."

Other sections of the country, noting this remarkable development of the swamps of Paulding county, are taking up the fight for good roads and thorough drainage. Putnam county commissioners are this week offering for sale road bonds amounting to $81,500, while Fulton county will next week sell similar bonds amounting to $41,000. It is safe to say that the coming year will witness the most rapid strides in the matter of road building that has ever been experienced in northwestern Ohio.

MORE MARYLAND ROUTES

Baltimore, Md., April 17—All the routes for good roads in this state to be built from the $5,000,000 appropriation by the last legislature, have now been named, with the selection of the final roads in Frederick, Montgomery and Harford counties. These routes are:

Frederick county—Frederick pike, from the Carroll county line to the Washington county line; Jefferson pike, from the city of Frederick to Jefferson; dirt road from Jefferson on the Washington county line, near Knoxville; the dirt road north from New Market to New London, and south from New Market to the intersection of the Kemptown road, about .6 mile south of the state-aided road; the Opossumtown turnpike, from Frederick north, then the dirt road from the Opossumtown turnpike to the Emmitsburg turnpike, near the Harmony Grove, and the Emmitsburg turnpike in its entirety to Emmitsburg.

Montgomery county—At the District of Columbia line at Seventh street extended—Silver Springs Station—via Wheaton, Norbeck, Oakdale, Olney, Sandy Springs, Ashton and the dirt road on to Snell's bridge; beginning at Norbeck to Rockville; Rockville, Gaithersberg, Quince Orchard, Darnestown, Davisonville, Beallsville, beyond Dickenson to the Frederick county line; from Gaithersburg via Middlebrook, Henderson's Corner, Cedar Grove, Damascus to the Howard county line. The Norwood addition of the Union turnpike, south from Sandy Springs and from Olney to Rockville.

Harford county—From Belair via Kalmia to Conowingo, provided the county will build a bridge suitable in the judgment of the commissioners, across Deer Creek.

Legal Lights and Side Lights

TOWNSEND BILL PASSES

AFTER a long period of backing and filling, the Townsend bill, which has been before the Pennsylvania state legislature for many weeks, finally passed the senate Wednesday, April 14. The senators amended it out of all semblance to its original self, practically killing all but the enacting clause and substituting the measure introduced by Senator Grim. The house refused to concur in the senate amendments, and the bill went to the conference committee. A long wrangle ensued. But all hands were united on so many important features of the two bills that were practically identical that it was decided to compromise. The Grimites conceded a few points; so did the Townsendites. The former receded from their main feature of making the operator the basis of the tax; the latter compromised on the matter of the final disposition of the fines. And thus, by granting a little here and there, both sides came to an agreement which was immediately ratified by both houses, and the bill, which will bear the name of Townsend because it contains more of the house measure's features than of that which originated with Senator Grim, is now in the hands of the governor. The latter will assuredly sign it.

The motorists of the state are, generally speaking, satisfied with the new law. True, it does not give them all they wanted; but it is a decided improvement over the old law. In section 15 the motorists get rid of the double license tax and the manifold regulations which formerly obtained. "No city, county, borough or township," reads the section in question, "shall have power to enforce or maintain any ordinance, rule or regulation inconsistent with or fixing a rate of speed lower than that permitted by this act, or require of any person any license tax upon or permit to operate motor vehicles upon the public highways, or the registration of any motor vehicle, and all such local ordinances, rules or regulations now in force shall expire and shall be null and void and of no further effect," etc. An exception is made in favor of public parks, "the proper authorities of which may restrict the speed of motor vehicles to such a rate as may seem reasonable, provided said rate shall not be less than that allowed other vehicles."

The license fees, which are payable to the state highway department or to a lawful agent appointed by the highway commissioner, are based upon the power of the car, a fee of $5 being required for one of less than 20 horsepower; $10 for cars of more than 20 and less than 50 horsepower; and $15 for all cars of 50 horsepower or more. Motor cyclists must pay $2, but are not required to carry the front and rear metal tags necessary on motor cars. Motorists from other states are given 10 days' grace during which they are exempt from the payment of license fees, provided they carry their own state tag, and also provided the commonwealth from which they hail extends similar courtesies to Pennsylvania motorists. Only Pennsylvania tags can be carried, except in case of visitors, who are allowed the aforementioned 10 days' leeway.

Manufacturers and dealers are limited to five license certificates and sets of tags each, to be used in testing and demonstrating. The tags bear the legend "Penna. Dealer," and each such certificate and set of tags will cost the manufacturer or dealer $5. Such cars may be operated only by a licensed driver, who must be over 18 years of age, must verify his ability by oath or affirmation and must wear on his manly bosom in plain sight a 2½-inch badge inscribed with the words "Pennsylvania Licensed Driver"—for all of which he must pay the highway department $2.

It will cost from $100 to $300 to operate a motor car while drunk, or it may be a year in jail—or both, if the offense is particularly flagrant—besides which the highway commissioner may suspend the drunk's license for 6 months. To operate a car under any license tag but its own, or the operating of a car without the consent of its owner, lays the offender liable to a $100 fine, or imprisonment not exceeding one year, or both.

Lost tags or badges are replaced on payment of a fee of $1. When a car is sold by its owner its registration expires and the seller must notify the department at once, giving name and address of the buyer and returning his old tags and registration certificate. Should the original owner apply for a new certificate and tags within the period of 2 months, however, he is compelled to pay but $1 for them.

The new speed rate ranges from a maximum of 1 mile in 2½ minutes in the open, to a mile in 5 minutes in built-up sections; and "when a motor vehicle meets or overtakes a street passenger car which has stopped for the purpose of taking on or discharging passengers, the motor vehicle shall not pass said car on the side on which passengers get on or off until the car has started and any passengers who have alighted shall have gotten safely to the side of the road." This latter is the rule put in force by the director of public safety of Philadelphia, to prevent a recurrence of the numerous accidents which happened to passengers alighting from trolley cars at street crossings.

Constables and police officers may request a driver to exhibit his registration certificate or license at any time, and may arrest, "upon view and without a warrant," any violator of the provisions of the new act, but "such constable or officer shall forthwith make and file with the magistrate and justice of the peace before whom the person arrested is taken, and furnish a copy thereof to the person arrested, an affidavit setting forth in detail the alleged violation of the section of the act complained of." The arrested person, if unable to give sufficient bail, may deposit with the magistrate any article of sufficient value, in lieu of which the latter may take and hold in custody the car itself.

Offenders—other than drunks and joy riders—found guilty of breaking any provisions of the new law are penalized not less than $10 or more than $25 and costs for the first offense, and in case of failure to pay within 48 hours the offender is liable to a 10 days' rustication in jail; although the culprit may secure a jury trial by depositing with the magistrate an amount equal to the fine and costs, or by entering security to pay the same. A second offense within 1 year means $25 to $50 fine and costs or 20 days in limbo; and a third offense will cost the recalcitrant motorist a fine ranging from $50 to $200 or 30 days in the county prison. Jury trials for two- and three-time offenders may be had by the accused on the same terms as in the case of a first offense.

The disposition of the money, which was one of the main bones of contention between the advocates of the Townsend and Grim bills, resulted in a compromise, the amended measure providing, as before, for the payment of all registration and license fees to the state highway department, to be transferred thence to the state treasury and used for the improvement of roads throughout the commonwealth. But the money collected in fines is divided, that for speed violations going to the treasurer of the city, borough or township wherever the offense was committed, for road construction and maintenance. And all money collected from motorists offending in other ways to go to the state treasury. Burgesses, magistrates, justices of the peace and other officers who collect these fines, must make sworn quarterly reports thereof to the state highway commissioner.

Section 23 reads: "In any proceeding for the violation of the provisions of this act, the registered number displayed on the motor vehicle shall be prima facie evidence that the registered owner of said car was then operating the same. Provided, however, that if at any hearing

or proceeding the owner shall testify under oath or affirmation that he was not operating the car at the time of the alleged violation of this act, and shall submit himself to an examination as to who at that time was operating the car, and reveal the name of the person, if known, then the prima facie evidence arising from the registered number shall be overcome and removed and the burden of proof shifted.''

The act of April 23, 1903, and that of April 19, 1905, and all other acts inconsistent with the new law, are repealed, except that those sections of the last-mentioned act providing for the licensing of residents of Pennsylvania shall remain in force until December 31, 1909.

WOULD TAX BY WEIGHT

At a conference between the leaders in the New York state legislature and a committee of prominent motorists in Albany last week it practically was decided to compromise on the matter of an annual registration fee for motor cars. The committee consisted of Giles H. Stilwell, of the H. H. Franklin Mfg. Co., of Syracuse; Secretary Elliott, of the American Automobile Association; Charles Thaddeus Terry, of New York, and Judge W. H. Hotchkiss. The bill under discussion was the one introduced by Senator Jotham P. Allds last January providing for ''the registration, identification and regulation of motor vehicles operated upon the public highways of this state and of the operators of such vehicles.'' It is the desire of Senator Allds to raise the sum of $500,000 for the improvement of public highways this year, and he proposes to do it through the levying of a fee on every motor car in the state. No strenuous objection will be made to the passing of the bill, providing the fees that are to be levied are reasonable and that such an act will eliminate any further possibility of taxation. The committee desires to see good laws enacted, and numerous restrictions that are now placed on the owners and drivers of cars eliminated. After the conference it was stated that the bill with some amendments would in all probability be passed this week, as there is a strong disposition on the part of the legislators to affix some sort of tax to the motor cars in order to meet road repairs and improvements. The committee will insist that all of the money so raised shall be devoted to the improvement of the highways and that none of it shall be assigned to any other channel of expense. It is the strong conviction of the members of the committee that any such legislation is fundamentally unconstitutional, but they have expressed their willingness to concede partially to the wishes of the men who are fathering the bill, providing the fees are reasonable and that existing monstrosities in the motor laws are abolished.

Novel in the Allds bill is the provision made for licensing the cars, the framer of the measure favoring fees decided by the weight of the cars rather than horsepower. Each registration must be renewed on the first day of January of each year. The fees are graded as follows: For a motor vehicle weighing 1,500 or less, $5; more than 1,500 and not over 2,500, $10; for every 500 pounds in excess of 2,500, $5 additional. Those who have registered under the existing law subsequent to December 31, 1907, will be entitled to a credit or rebate of the fees paid under such law for registration. Commercial vehicles or electrics used within the confines of a city are to pay only $5. Provision also is made for the registration by manufacturers and dealers, the fee for such being placed at $15, which is a sort of a blanket registration in that a maker or dealer can secure as many duplicates as he desires for $1 each.

Non-residents are exempt providing they have tags from other states in which reciprocity is shown. The Allds bill also forbids the use of non-skidding devices on the public highways except when the roads are wet and slippery or covered with ice or snow. Registration fees imposed by the Allds act upon motor vehicles other than those of manufacturers and dealers; those used solely for commercial purposes and, if propelled by electric battery power; those used solely within the confines of a city, will be in lieu of all other taxes, general or local, to which motor vehicles may be subject as personal property under the laws of the state.

There is a liberal interpretation of the speed proposition, the bill simply stating: ''Every person operating a motor vehicle on the public highways of this state shall drive the same in a careful and prudent manner and at a rate of speed so as not to endanger the property of another or the life or limb of any person.''

Local ordinances are prohibited by a clause which says: ''Except as herein otherwise provided, local authorities shall have no power to pass, enforce or maintain any ordinance, rule or regulation requiring from any owner or chauffeur to whom this act is applicable any tax, license or permit for the use of the public highways, or excluding any such owner or chauffeur from the free use of such public highways, or in any other way respecting motor vehicles or their speed upon or use of the public highway; and no ordinance, rule or regulation contrary to the provisions of this act, now in force or hereafter enacted, shall have any effect; provided, however, that the powers given to local authorities to regulate vehicles offered to the public for hire, and processions, assemblages or parades in the streets or public places, and all ordinances, rules and regulations which may have been or which may be enacted in pursuance of such powers, shall remain in full force and effect; and provided, further, that local authorities may set aside for a given time a specified public highway for speed contests or races, to be conducted under proper restrictions for the safety of the public; and, provided, further, that local authorities may exclude motor vehicles from any cemetery or grounds used for the burial of the dead.''

SCHANTZ BILL IN MICHIGAN

Michigan is considering what is called the uniform bill, which closely follows the draft made by the New York-Connecticut-New Jersey combination and which is fathered by Representative William Schantz, a Barry county farmer, who has been much impressed with the features of the eastern measure. The Michigan house adjourns May 6, though, and as the bill is still in committee, it is doubted if it will be reached this session. The chief point of difference between the Schantz bill and the uniform measure is as regards speed. In the eastern bill no speed limit is named, but Schantz inserted a 25-mile limit in the open country, 8 miles in the business districts and 15 miles elsewhere. Afterwards there was an amendment raising the 15 miles to 20, but there has been some opposition to this. It is proposed to tax by horsepower, with $3 a year up to 20, $5 from 20 to 30, and $10 for one above 30. What is left of the fees after the expenses of collecting them have been deducted will be spent on good roads building outside of the cities and villages. The question has been raised as to the constitutionality of this clause and it is now being investigated by the attorney general.

JERSEY LEGISLATION

The New Jersey legislature during its last session passed measures requiring all vehicles to carry at least one light at night; making joy riding, driving while intoxicated, on a bet or without a license, a misdemeanor; a maximum of 25 miles and hour in the open country, and a greatly reduced schedule of fees for justices and constables; 8-day tourist's license for $1; applying all money received from motoring sources to the repair of roads.

PROPOSES SLOW PACE

Members of the Milwaukee Automobile Club are considerably wrought up over the statements made by Judge A. C. Brazee, of the district court of Milwaukee county, that the speed of motor cars on Grand avenue and Wisconsin street, the two main thoroughfares of Milwaukee, be reduced from 10 miles an hour to 4.4 miles an hour. Since Judge Brazee first declared himself in favor of a reduction, the matter has received much attention from non-owners, who are trying to get the judge to appear before the legislature to propose such a measure. Judge Brazee figures that the speed of the winner of the Olympic marathon race was 15.8 miles an hour; that of an ordinary man is 10.2 miles an hour, and of ''women, children and oldish people'' 4.4 miles an hour. The latter class, he says, should be safe-guarded by reducing

the speed of motor cars to that figure. Nothing is said of carriages, delivery wagons or omnibuses, which tear up the principal streets at a rate that makes a motor car appear slow in comparison.

HOLDS MOTORIST LIABLE

One of the first civil suits to be tried in connection with a motor accident was ended a few days ago at Cambridge, Mass, when Warren R. Littlefield, administrator of the estate of Richmond H. Littlefield, of Melrose, was awarded a verdict of $3,500 by a jury. The defendant was John R. Gilman. He had been sued for $25,000. The action grew out of an accident at Winchester when a motor car owned by Mr. Gilman collided with one in which Mr. Littlefield was riding. The latter was thrown out and so injured that he died within a month.

MORE POWER FOR JUSTICES

The Connecticut motor bill, as well as a measure providing for the establishment of the office of commissioner of motor vehicles, has been reported to the senate. As regards the commissioner of motor vehicles measure, a peculiar situation exists. It is stated on good authority that should this measure be rejected, motorists may well look forward to the enactment of a law which will give justice courts the power of revocation of licenses. There appears to be much feeling at present against out of state motorists who have a mania to approximate the speed of express trains. The chief objection to the bill proper, drawn up by the committee on roads, rivers and bridges, is the provision calling for a speed of 10 miles per hour at intersecting streets. It is pointed out that this provision becoming a law would give too much power to country constables and result in the establishment of the old time menace, the trap.

MAINE STANDS PAT

The session of the Maine legislature is all over for this year and there were no changes made in the motor laws. The only motor subjects that came up for consideration was one allowing the residents of Bar Harbor the right to vote to exclude vehicles from that place, and a law relative to motor car insurance. This latter law allows insurance companies that have Maine licenses and have a marine department, to insure motor cars under such form of policy as shall be agreeable to the company and the owners of cars.

PRACTICALLY A NEW LAW

The session of the New Hampshire legislature is now at an end and upon the books is what is practically a new motor law. During the last days of the session there was some division relative to the provisions, but finally a compromise was reached. The new law does not go into effect until January 1 next. The registration of motor cars and motor cycles is now made annual. Heretofore a registration was continual year after year. A flat rate of $10 has been provided for the motor cars and for motor cycles $2. The fee was formerly $5. It was at first proposed to tax the cars according to horsepower, but the proposition was dropped. The license for a dealer is $25. Non-residents must register after remaining in the state 10 days. The speed limit has been changed so that where it was 8 miles per hour in the compact sections it is now 10, and in the open country it has been raised from 20 to 25 miles. All the fees taken in for registering the vehicles will go to the highway department for the maintenance of good roads when the expenses for running the department have been first paid. It is expected that the sum from this source will net the state a good revenue.

BADGERS ON FIRING LINE

This week will see the first definite action by the Wisconsin legislature on the huge pile of bills affecting motor cars. Several hearings have been arranged by the various committees of the senate and assembly, and late this week the Wisconsin State A. A. will have a big delegation at the capital to argue for or against the measures as outlined in a circular recently issued by the association. The various clubs of the state have been holding meetings to select its most persuasive members as committeemen to go to Madison. Several new clubs have been formed since March 1 to assist in the fight against bad legislation.

MUST BE CAREFUL

In awarding his decision in favor of the plaintiffs as a result of a motor car accident in which a horse ridden by a young girl on the main street of Earlton, Kan., became frightened at the motor car and bolted, throwing her to the ground, the judge of the supreme court held that unless every precaution was taken by a driver of a motor car he was liable to prosecution. The terms of the judge's ruling were: "Any person having control or charge of any motor car has the right to drive it upon any public street or highway, but in so doing he must exercise every reasonable precaution to prevent the frightening of horses and to insure the safety of any person riding or driving the same; if he does not do so he is liable for heavy damages to the person or property injured as a result of his carelessness."

The supreme court in passing on the case, affirmed the judgment of a lower court, which awarded damages for $3,000, but in its decision merely passed upon the law in the case—whether or not the defendant had exercised due precaution in driving his machine—and not upon the large amount of damages assessed by the jury in the case in the first place. The amount of damages was not involved in the appeal or made a point in seeking a reversal of the lower court. In summing up its decision against the motorist the court commented as follows:

"A motor car is recognized in law as a proper vehicle of transportation upon the public highways of the state. The operation of the machine, however, is subject to the law of the road. It is obviously incumbent upon the person having the control of a motor car in the exercise of reasonable precaution to prevent the frightening of horses or the injury of persons riding or driving the same, especially in localities where motor cars are not much used."

The fact that the motorist did not slacken his speed after the plaintiff's horse was frightened appeared to be the main point against him in the decision of the case.

WAGING WAR ON DUST

The Massachusetts legislature has passed a bill that is on a line with advanced legislation as a direct result of the use of motor cars. This relates to the use of oils or other materials for sprinkling the streets. The petition was presented by Mayor Hutchinson, of Newton, and was favored by the state highway commission. Last year a special bill was passed allowing New Bedford to do this, and it was decided that a general bill would benefit all the cities and towns in the state, so Governor Draper signed it just as soon as it was passed. The new law reads as follows:

> Any city or town may sprinkle or spread upon all or a part of its public ways or portions thereof water or any liquid or material suitable for laying or preventing dust and preserving the surfaces and for sanitary purposes, and all statutes providing for watering such public ways shall apply to the use of such liquids and materials, including the appropriation of money, the expenditure thereof at the expense of the city or of the abutters, the assessment upon abutting estates, and the collection of such assessments and proceedings therefor.

ESTABLISH A PRECEDENT

Judges Murray and Wentworth, two of the men who dispose of minor offenses in the municipal court at Boston, gave decisions last week that have started the motorists talking. Two chauffeurs were in court, charged with not having any horn or bell on their machines, having been arrested by one of the special policemen who delight in doing this in the Hub. The two defendants stated that they could give warning of their approach by cutting out the muffler, and the judges agreed that this would give ample warning and so the defendants were dismissed. Now the question is whether it was a wise policy, as it is well known that the noise of the muffler cut-out is objectionable, and the state law says that cars must have a bell or horn to give warning.

BADGER LAWS WILL STAND

The Wisconsin legislature will not change the present statutes relating to speed of motor cars, according to members of the committee considering the bill. The Milwaukee Automobile Club and Wisconsin State A. A. urged the measure removing all limitations and making reckless driving alone a misdemeanor.

The Motor Car Repair Shop

PRECAUTIONS IN SOLDERING

MANY mechanics have had their patience sorely tried, and in some cases been severely burned, while pouring lead around a damp or wet joint, to have it explode, blow out or scatter from the effects of the steam generated by the heat of the lead. This whole trouble may be avoided by putting a piece of resin, about the size of a walnut, in the ladle and allowing it to melt before pouring. In soldering radiators, pumps, and water or oil piping, much trouble is often experienced in trying to stop a leak, or close a hole, before the part to be soldered has been thoroughly cleaned and dried. In repairing a leak in a gasoline tank, it must first be completely drained of its contents and all vents left open, so that the fuel adhering to the sides can evaporate and pass out. A tank has often been ruined by an explosion, owing to an attempt on the part of the repairman to solder it before assuring himself that it was entirely free from gas.

PREVENT RIMS FROM RUSTING

A good policy, practiced by many drivers, is that of keeping the rims of the wheels of their cars free from rust to facilitate the removal of the tire casing should tire trouble occur. Tire experts agree that powdered graphite and glycerine make the best preparation to apply to wheel rims and tire rings for the prevention of rust. This is compounded by taking a small quantity of powdered graphite and mixing it with glycerine until it becomes a thick paste, when it can be applied with a brush. Graphite and linseed oil paint is another preparation for this purpose. If tires are removed about once a month, the casings examined inside and out, and soap-stone applied to the rims of the wheels, the removal of a tire, or the replacement of a tube or casing will cease to be a hardship.

HOW TO ANNEAL

In working brass and copper, it will become hard, and if hammered to any great extent will split. To prevent cracking or splitting, the piece must be heated to a dull red heat and plunged into cold water; this will soften it so it can be worked easily. Be careful not to heat brass too hot, or it will fall to pieces. The piece must be annealed frequently during the process of hammering.

VULCANIZING TIRES

To vulcanize a tire, first remove the rubber from the outside of the tire for a space of ½ to 1 inch either side of the hole lengthwise of the tire and 2 to 3 inches of the way around the cross-section of the same, using either an emery wheel or coarse file, but do not injure the fabric. Next clean the inner surface of the tire with benzine or gasoline, and clean it thoroughly. All soapstone, talc and rubber cement must be removed from the inside of the tire or the final result will be a failure. Now cover the inner surface where it is to come in contact with the patch with vulcanizing cement, at the same time cementing the outside where the rubber has been removed, being careful to have the edges of the old rubber thoroughly covered. Hang the tire up and let the cement dry for from ½ to 1 hour, according to the thickness of the cement used and the dryness of the atmosphere in which the tire is to hang. Next take a piece of friction cloth, nearly as large as the place from which the rubber has been removed, and place it on the inside, then place a piece of the same size on the outside, and roll them both down hard. Now give the outside a second coat of vulcanizing cement, let it dry a few minutes and then cover the entire space with rubber and roll it down firmly. Trim the exposed edges so that they will make a good union with the old rubber, and roll the edges down hard. The tire should now be sprinkled with talc, and placed in the sectional vulcanizer. This should be done at 265 degrees of heat, and with ordinary tires a cure of about an hour is sufficient. The user of the vulcanizer will have to be governed to a certain extent by his own experience in this line of work.

COLORING BRASS

In the Reader's Clearing House section of this issue, and also in the issue of April 8, formulæ are given for changing the color of brass, black nickel electroplating, and giving polished brass articles a gun-metal finish. It is found that brass lamps are more troublesome to keep clean than nickel plate, and nickel more troublesome than black brass or japan. If the trouble of keeping brass parts bright becomes unendurable they can be bronzed or plated as per the above mentioned formulæ; or its color changed to that of grayish steel, brown black, or blue black, by dipping in the following solutions: Steel gray—Water ten parts, muriatic acid two parts, sulphuric acid one part, arsenious acid one part. Brown black—muriatic acid 1 gallon, carbonate of iron 2 ounces, arsenious acid 1 pound. Blue black—muriatic acid 1 gallon, sulphate of iron 2 ounces, arsenious acid 1 pound. It may be used hot or cold, with or without current, but works best hot, and with a current, using steel anode.

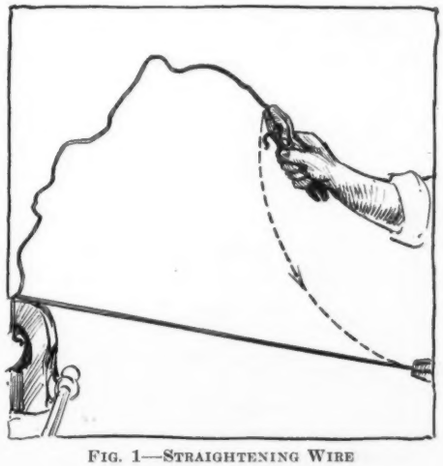


FIG. 1—STRAIGHTENING WIRE

PLUGGING HOLES IN CASTINGS

According to the American Machinist, where cores of other holes in castings are to be filled it is the common practice pretty nearly the world over to tap out the hole with a gas or other taper and plug it with a gas or other threaded plug. This is neither the best nor the cheapest way. If the hole is to be plugged for looks only, drill out the hole, turn a plug to fit and drive it in; if subject to steam or water pressure, ream the hole, turn a plug to fit and drive it in. If not larger than 2 or 3 inches and driven with a machinist's hand hammer, nothing less than a hydraulic press or freezing water will force them out by direct pressure. Such plugs can be turned or planed off without unscrewing by the tool. The streak left by the thread when they are threaded in is avoided, and aside from the difference in the iron they will not show. In cases of water-jacketed gas engines, freezing water may force them out and avoid a cracked jacket.

STRAIGHTENING WIRE

On passing through a shop the other day, it was surprising to see a young repairman trying to straighten a piece of copper wire by pounding out the bends with a hammer. As shown in Fig. 1, any piece of soft iron, copper, other wire, of small diameter may be straightened quickly by making one end fast in a vise or winding it around some projection, taking hold of the other end with a pair of pliers, and drawing the wire taut with a jerk.

HOW TO BRAZE

Before starting to braze, clean the articles thoroughly with a file, emery-cloth or sand-paper. Fasten the parts to be brazed firmly together, so they will not part when heated in the fire. Place over a slow fire of charcoal or well coked coal. Sprinkle on the parts to be brazed a small quantity of pulverized borax; as soon as this is done boiling and has flowed to all parts, then put on the spelter; when the spelter melts it will generally run in globules; these may be broken up and spread with a piece of wire.

The Readers' Clearing House

EDITOR'S NOTE—In this department Motor Age answers free of charge questions regarding motor problems, and invites the discussion of pertinent subjects. Correspondence is solicited from subscribers and others. All communications must be properly signed, and should the writer not wish his name to appear, he may use any nom de plume desired.

DIFFERENCES IN COILS

SUMMITVILLE, IND.—Editor Motor Age—Will Motor Age let me know through the Readers' Clearing House what difference there is in the internal construction of a master vibrator coil and a common vibrator coil? Can a common coil be used in the same manner as a master vibrator without injury? What are the disadvantages in using a single coil and distributer? There must be some serious defect in this arrangement or manufacturers would use a single coil and distributer in place of four-unit coils and timers.—C. Waltz.

In Fig. 2, is illustrated a master vibrator coil, in that there is but one vibrator V for the four units of the coil, these units being designated respectively C, C, C, C, and each consisting of a primary winding P and a secondary winding S. In a multi-vibrator coil there are four vibrators—one for each of the units. The advantage of the master vibrator, as illustrated, in comparison with where four vibrators are used, is that there is but one vibrator to keep in adjustment, and this vibrator serves for all four cylinders; whereas, with four vibrators all four have to be kept in adjustment and the difficulty of keeping the adjustment of all the same is a considerable factor. The internal wiring of a master vibrator is shown in the illustration, in which the primary windings P are all united in parallel at the top by a wire W, and with the lower ends connecting respectively with the segments of the commutator T. The primary winding MP which operates the vibrator V is in series with this winding, the wire W1 connecting from the battery and passing directly through the master primary MP. The four condensers, C1, C2, C3 and C4, are in parallel with the primary windings. Each of the secondary windings S connects direct to the spark or igniter plugs, designated respectively H1, H2, H3 and H4. Fig. 1 illustrates the Splitdorf master vibrator, in which the four coils are designated 1, 2, 3 and 4, and a fifth unit V in the left end of the box contains the master vibrator. The four primary windings connect direct by the wires P with the timer, and the secondaries are connected direct with the plugs. In the intrnal wirings of all of the primaries are in parallel with the electro magnet in the unit V which operates the master vibrator. It is impossible to use a common four-unit coil in the same manner as a master vibrator coil is used. The trouble with a single coil and distributer has been the distributing of the high-tension current, many using the scheme having found it impossible to get distributers that could stand up under the high voltage strain, and because of this having to drop the system.

MOTORS FOR MOTOR BUGGIES

Smithville, Mo.—Editor Motor Age—Will Motor Age kindly give me the names and addresses of concerns building motor buggy motors, other than the motor buggy companies?—R. S. Woods.

BOAT VS. CAR ENGINES

St. Boniface, Manitoba—Editor Motor Age—Through the Readers' Clearing House will Motor Age answer the following questions: I have a two-cylinder opposed four-cycle motor car engine which I wish to place in a large boat. The motor has a cylinder size of 4¾ by 4½, and the manufacturers claim for it 18.05-horsepower at 1,100 revolutions. Am I right in supposing that the motor will run slower in the boat and therefore develop less horsepower? What marine horsepower should it develop at 600, also at 800 revolutions? Do any marine engines run faster than that satisfactorily? Why does an engine run slower in a boat than in a car? What rating do marine engine manufacturers give for their engines of about 4¾ by 4½? Should I put on a heavier flywheel to get steady running under the changed conditions? Would my engine run slower and therefore develop less power if the hull of the boat is larger and heavier?—G. Levier.

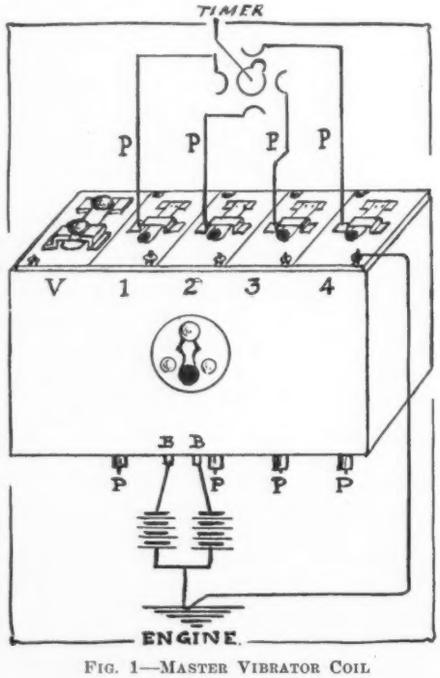


FIG. 1—MASTER VIBRATOR COIL

Your motor should show 18.05 horsepower at 1,000 revolutions per minute. You would run this motor slower in a boat in order to reduce vibration. You could run your motor as fast in a boat as in a car, but to do so the propeller wheel would need to be very small. In the combination of a motor boat three factors must be considered—the motor, the propeller wheel, and the hull of the boat. The motor will revolve at the same speed as the propeller wheel, and, if you drove the propeller wheel at 1,100 revolutions per minute the water would be badly churned and energy wasted. The problem is to adapt the power of the motor to the size of the propeller wheel and both with special reference to the hull employed.

CHAINLESS MOTOR CAR

Duluth, Minn.—Editor Motor Age—Will Motor Age give me some information relative to a chainless motor car, patented in July, 1907, by W. C. Price, of Chicago, and is now about to be manufactured by the W. C. Price Mfg. Co., Chicago. What is the opinion of Motor Age in regard to a shaft-driven or efficiency of friction-driven cars?—C. E. Johnson.

Motor Age cannot give the present location of the company referred to. Regarding shaft-driven cars there are many more of them manufactured in America at the present time than there are chain-driven types, and abroad the majority of small cars are chain driven, but many builders of high-powered machines continue side-chain drive. There are in use in this country at the present time a great many friction-driven cars, but Motor Age has not any data covering their efficiency.

TIMING THE VALVES

Elwood, Ind.—Editor Motor Age—Will Motor Age tell what is the trouble with my two-cylinder Maxwell runabout? When the throttle is open full there is a wind blowing from the carbureter. The motor does not miss and it pulls well. Are the valves timed correctly? Will Motor Age make a sketch showing how to time the valves?—M. S.

The cause of the wind blowing, or whistling, from the carbureter, is due to an air leak at some point. This leak may occur in the throttle which has become worn at one end; it may be occasioned by a blow hole in the carbureter casing, or a leak in the intake pipe. The best way to locate it is to listen closely with the engine running and try to locate whether it occurs near the carbureter or in it. If

in the carbureter make a close examination of the throttle, trying with the fingers to discover any looseness of it in the casing. This noise is not caused by the timing of the valves. The simplest way to ascertain if the valves are timed properly is to turn the flywheel until the part marked "center" is up, and opposite the center of the crankcase. This done, take the flywheel and oscillate it slightly back and forward to determine whether the right or left cylinder valves are working first. As soon as this is decided the exhaust should be closed when the flywheel has been turned 1¾ inch to the right past the dead center, and the intake valve begins opening when the flywheel is 2⅝ inches past the dead center. You can determine when the valves start opening or closing by watching the pins in the valve stems which work in slots in the housings for the valve stems. When a valve is idle, which is the case when the flywheel has the center mark up, the valve stems should be slightly loose so that seizing them between the thumb and finger they can be quivered, with the exception of the exhaust valve, which does not close until 1¾ inch past the center mark. On the opposite side of the flywheel rim are other marks for intake valves opening and closing, but it is not necessary to bother with them. You have only to concern yourself regarding the opening of a valve, or the closing of it, because, if you set the opening right, the contour of the cam decides when the valve closes, and the closing could only be altered under such conditions by changing the shape of the cam. The amount of life to the valve can be varied by adjustments, provided if a 1909 model.

TO BLACK NICKEL LAMPS

Valley Ford, Cal.—Editor Motor Age: In Motor Age, issue of April 8, was published a formula for finishing brass motor car lamps in black nickel. Through the Readers' Clearing House will Motor Age advise method of applying the solution? Can this work be done by any person?—An Old Subscriber.

Black nickel—sometimes called gun metal—solution, is applicable to all classes of metal goods, whether plated or not. This is used to a great extent for getting French gray and gun metal finishes. Strictly speaking, it is not an oxidizing solution, but a plating solution, as current must be used to get results. The formula follows: Nickel solution, 1 gallon; carbonate of ammonia, 3 ounces; ammonia, 1 pint; white arsenic, 1 ounce; cyanide of potassium, enough to make solution clear. Pulverize the carbonate of ammonia; then dissolve it in the nickel solution; next add the ammonia; dissolve the arsenic in a small quantity of the solution; and when made into a thin paste add it to the solution. It should be about the color of dark vinegar. After thoroughly mixing it is ready for use, using a nickel anode and not too strong an electric current. If the black deposit is streaked or spotted, remove the object and brush; then replate, using a little more current. If too much current is used the work is liable to come from the solution a dirty gray-black. The anode in this solution must be kept clean to obtain the best results. After the solution has been used for some time the deposit may be off color. In this case add a little more arsenic. As may be plainly seen, to use the above formula successfully, a knowledge of electro-plating is quite necessary. In the April 8 issue of Motor Age, a formula for bronzing brass to various colors by simple immersion also was given.

TOURING INFORMATION WANTED

New York—Editor Motor Age—Through the Readers' Clearing House will Motor Age state how many miles would be covered in the following tours and the distances between the various points? I would like, also, suggestions from readers as to the best routes and conditions of roads: From the city hall, New York, to New Haven, Conn.; also to Springfield, Mass., Greenwich, Mass., via Palmer; Brattleboro, Vt., via Northfield, Mass.; Portsmouth, N. H.; Boston, Plymouth, New Bedford, Mass., and Providence, R. I. —P. H.

Your inquiry is apparently not for one specific route in New England, but rather for a number of connections scarcely related to each other; for this reason it is difficult to give a direct answer to it. Not because the Official Automobile Blue Book is published by the Class Journal Co., but because it is really the only place where practically all this data is to be found Motor Age takes the liberty of referring you to the 1909 edition of the New England book, where you will find practically all your inquiries answered. The single exception is the connection from Springfield, Mass., to Greenwich, Mass., via Palmer. In several years' almost constant traveling in New England the writer never has seen or heard of this place. The condition of the roads about which you inquire can be covered in a single sentence: nearly all is fair-to-good country road, with a great many stretches of excellent macadam, particularly in Massachusetts, though in Vermont the country road largely predominates. From New York to New Haven is a route of 75 miles, covered in every particular on pages 68-76 of the New England Blue Book; all the routes out of Springfield are listed on page 387 of the same book, and you will no doubt find this list useful in reaching Greenwich, Mass., the location of which already has been referred to. For the various other places mentioned in your letter see the Index of Places in the New England Blue Book, depending in each case upon which direction you travel. If you will outline a more specific trip Motor Age will be glad to furnish you more specific data for it.

DIFFERENCE IN GEARING

Des Moines, Ia.—Editor Motor Age—Through the Readers' Clearing House will Motor Age tell me what difference in speed can be expected in two machines of the same weight—one geared three and one-half to one and the other three to one? In other words, I have a four-cylinder shaft-drive car that weighs 2,550 pounds, filled with oil and gasoline but without passengers, geared three and one-half to one. With this gear ratio the car will go

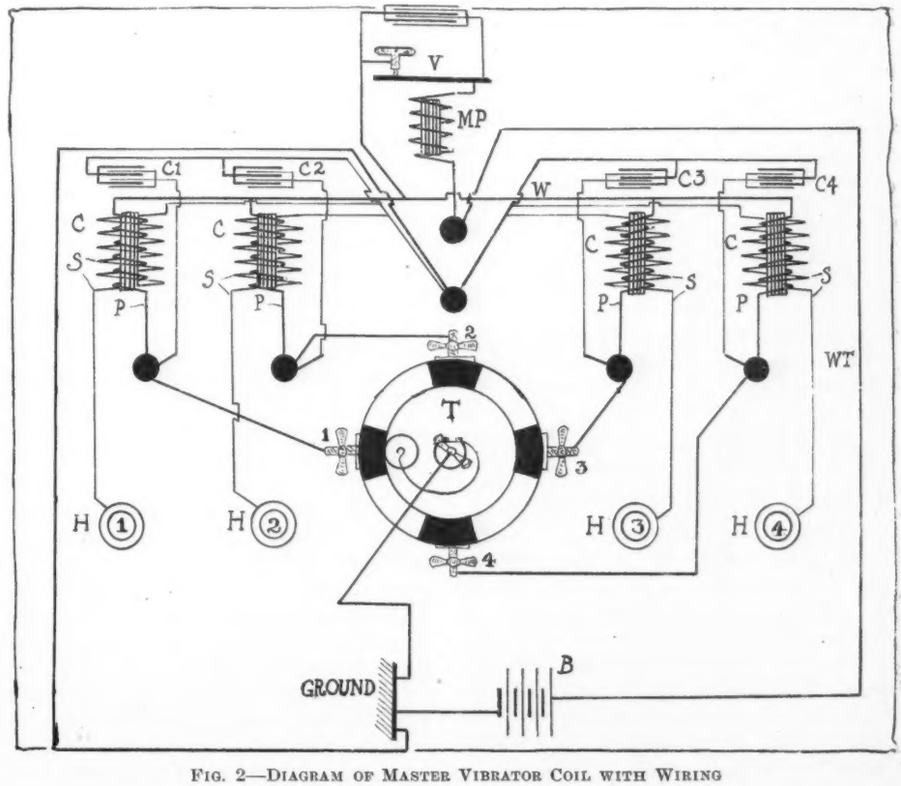


FIG. 2—DIAGRAM OF MASTER VIBRATOR COIL WITH WIRING

USING MOTOR CAR FOR MAIL WORK IN TEXAS

50 miles an hour. How much faster will the car travel geared three to one?—Subscriber.

Providing your motor has sufficient power, the fitting of a three to one ratio between the motor and rear axle should give you a speed of 58.3 miles per hour. It is quite impossible to say if in actual practice you will get this; but, providing your motor has the power, you will not be disappointed in this.

LINING UP AN ENGINE

Bedford, Ia.—Editor Motor Age—Will Motor Age please tell me through the Readers' Clearing House how to tell if a two-cylinder engine is out of plumb how to put it back in line with transmission shaft, and how to determine when I do get it back?—A Subscriber.

If you will furnish the name of the manufacturer of your car, or a drawing showing the relation between the flywheel of your motor, the transmission and the frame, Motor Age will be able to answer you question quite definitely; but as it is, Motor Age can only advise that you first level up the frame with a level-gauge, then place the level-gauge on the rim of the flywheel and see if it lines up with the frame; then apply the gauge to the transmission shaft and find how it lines up. To line up a power plant, a straight edge, a level-gauge, and some mechanical knowledge or ingenuity are necessary.

HISTORY OF THE GLIDDEN

Denver, Colo.—Editor Motor Age—Please give me the date, route, distance and winner of each of the Glidden tours, and also a short sketch of the purpose and benefits derived from the tours.—E. F. D.

The first Glidden tour held in 1905 was an 870-mile run, in which thirty-two cars competed. The winner was decided by popular vote, the award going to a Pierce car driven by Percy Pierce. No observers were carried during this tour. The route was from New York through Hartford, Boston, Plymouth, N. H., to Bretton Woods, and returned to New York by way of Concord, Worcester, and Lenox, Mass. The second Glidden tour, 1906, was a 1,200-mile run from Buffalo, N. Y., to Bretton Woods, N. H., by way of Utica, Saratoga, Elizabethtown, Montreal, Quebec, Jackman and Rangeley. Forty-eight machines started and thirteen finished with perfect scores. Because no winner was evolved and Pierce cars were among the thirteen perfect score holders, Percy Pierce was permitted to retain the trophy according to the provisions of the deed of gift. The third tour in 1907 was from Cleveland, O., to New York city, 1,570 miles, by way of Toledo, South Bend, Chicago, South Bend, Indianapolis, Columbus, Pittsburg, Bedford Springs, Baltimore, and Philadelphia. Forty-nine cars contested. The trophy was not given to any individual make of cars but to teams representing different motor clubs. The Buffalo club won the trophy. The fourth Glidden, 1908, was from Buffalo, N. Y., to Saratoga Springs, N. Y., 1,670 miles, by way of Cambridge Springs, Pittsburg, Bedford Springs, Harrisburg, Philadelphia, Milford, Albany, Boston, Poland Springs, Rangeley, and Bethlehem, N. H. As in the previous year, the trophy was competed for by club teams and at Saratoga Springs three teams were perfect, namely, Buffalo, Chicago and Columbus. The Buffalo team consisted of three Pierce cars, the Columbus of three Peerless cars, and the Chicago Motor Club team of two Haynes and an Oldsmobile. At Saratoga Springs it was decided that these teams should run off, and on the following day when the run-off began only the Pierce team started. The trophy was officially awarded to the Buffalo club. The original object of the tour was to have it a pleasure outing, but it has ceased to be such and is now a big manufacturers' reliability contest. The benefits to be derived from the tour are continued testing of cars over rough roads and under the watchfulness of observers. It offers an early opportunity to test cars.

CAUSE OF MISS-FIRING

Carroll, Ia.—Editor Motor Age—Having noticed several articles in Motor Age relative to mis-firing in the model 10 Buick, I have the following to offer for the benefit of other Buick car owners: The timer has ball contacts, and I find after a great deal of research that some of these balls have worn flat on one side, and when this flat side comes to the contact surface the result is that it misses. The remedy is of course a new ball.—A Subscriber.

IN MAIL SERVICE

San Angelo, Tex.—Editor Motor Age—I am a motor car enthusiast, also a constant reader of Motor Age, and am sending, herewith, for the benefit of other interested readers a photograph of one of the United States mail and passenger cars which make regular trips between San Angelo and Big Springs, a distance of 100 miles. Besides this mail car four two-cylinder Buicks and two two-cylinder Masons are in constant operation. From one to three cars leave each town every morning at 8 o'clock, except on Sundays. This line was opened up over 2 years ago with two cars, and it has always done a good business.—Henry Ragsdah.

FINISHING LAMPS IN BLACK

Westport, Mass.—Editor Motor Age—I have been trying to get a formula for finishing my lamps in black nickel. The formulæ given in Motor Age, issue of April 8, is not clear to me. I am unable to find any such thing as double sulphate of nickel acid. Is the arsenic used white arsenic, and the quantity of cyanide of potassium of use was not given. Is this color applied by immersion or electrolysis? —E. W. Burt.

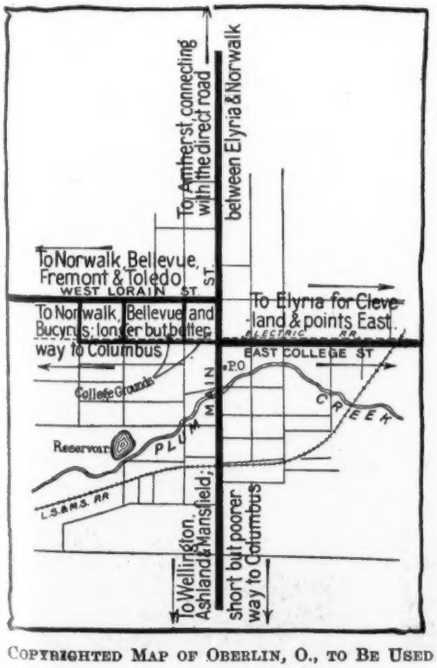
The double sulphate of nickel, more commonly known as double salts of nickel, as the formula should have read, is that of the sulphate of nickel and ammonium. To prepare this, first make up a mixture of one part sulphuric acid, two parts distilled water and one-third part of nitric acid. Make this warm in a stoneware vessel on a fire furnished with a good flue to carry off the nitrous fumes, and add pure nickel until the acid ceases to dissolve any more of the metal. Drive off the excess acid, if any remains, by boiling the solution for a short time, dilute it with one-quarter part its bulk of boiling water and set aside to cool. When cool enough to filter, pass it through a linen filter into a vessel capable of holding double the bulk of liquid. Next dissolve some sulphate of ammonium in hot water until it will not take up any of the ammonium salt, and set it aside to cool. Add the cold ammonium sulphate solution to the cold nickel

sulphate solution while stirring, until the nickel solution loses all its color and a copious precipitate of the double sulphate of nickel and ammonium has been thrown down to the bottom of the vessel. Pour off the supernatant liquid, and wash the crystals with a little more of the ammonium solution. The crystals may now be dissolved in hot water and filtered. The resulting solution may be employed as the nickel bath, or may be evaporated down and set aside to cool, when the double salt will crystallize out. White arsenic should be used, and just enough cyanide of potassium must be added to make the solution clear. This is really a plating solution, for the color is applied by electrolysis. Motor Age is advised that a brilliant and lustrous black may be obtained upon polished brass goods by simple immersion in the following: Verdigris ½ pound, ammonia 1 quart. Dissolve the verdigris in the ammonia and use hot, dipping the well-cleaned brass articles into the solution until they become black; then remove; rinse in hot water and dry in sawdust.

ASKS REGARDING GASOLINE KNOCK

Converse, Ind.—Editor Motor Age—Is there such a thing as a gasoline knock? What characterizes it and how can it be stopped, if at all? What causes it? I have a 1909 model 10 Buick. I have taken the motor all apart, examined everything for gears to magneto, wherever it was thought possible for a knock. When the motor is running idle, the knock is not noticeable, but when in use on the road the knock gets louder and louder as the gasoline throttle is advanced, either down or uphill—H. G. Boyd.

Several motorists have experienced what they designated as a gasoline knock, which, in some cases, was due to too rich a quantity of gasoline in proportion to the air. In the majority of cases motor knocks are due to other causes, and it would appear from your case that the knock not being noticeable when running idle, but which gets louder and louder as the throttle is advanced is caused by other conditions. There may be four reasons for this knock: First, the valves may be out of timing which can be corrected by seeing that they correspond to the timing on the flywheel. Turn the flywheel until the "center" mark is up. The intake valve opening is marked, also the timing for the exhaust closing. See that they correspond to these markings. Should the timing not be out you may have the magneto timed incorrectly with the motor. To determine if this is the case, bring No. 1 cylinder to the top center and remove the distributer cover and see that the distributing blade is in contact with No. 1 segment, which is the 3 o'clock position. If we compare the distributer to the face of a clock, then No. 1 cylinder is at the 3 o'clock position. No. 3 cylinder at the 6 o'clock mark, No. 4 cylinder at the 9 o'clock mark, and No. 2 cylinder at 12 o'clock. Should the magneto timing prove to be all right, it may be you have a wire wrong, so see if the wires from the respective distributer segments as indicated go to the cylinders in the order mentioned. Granted you have discovered the timing is correct all through, you may look for loose bearings in the connecting rods. Loose lower bearings can be detected by seizing the lower end of the connecting rod with the hand and working it up and down to see if any looseness is noticeable. A loose flywheel will cause a knock.



COPYRIGHTED MAP OF OBERLIN, O., TO BE USED IN AUTOMOBILE BLUE BOOK

CLEANING CAR UPHOLSTERY

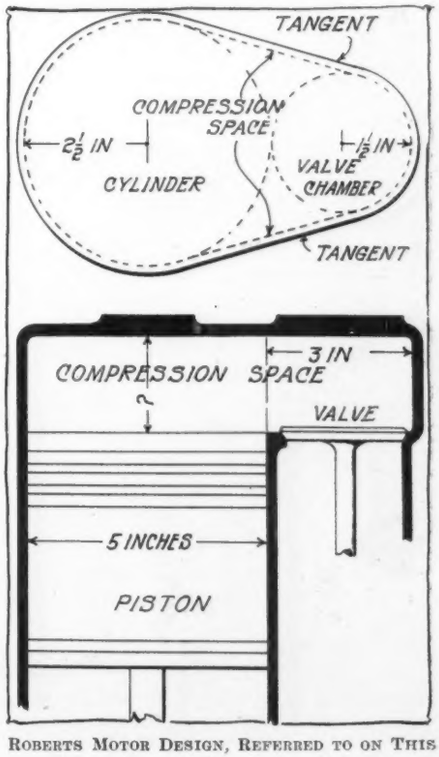
Chicago—Editor Motor Age—In the next issue will Motor Age advise through the columns of the Readers' Clearing House what is the best method for removing stains on the upholstering and restoring the luster? Will Motor Age also advise how varnish can be removed from brass?—E. S. V.

If your upholstering is of leather there are a number of preparations on the market which are giving satisfaction, and Motor Age is unable to learn which of these is best. To clean cloth upholstering, benzine probably would be most effective. Varnish may be most easily removed by means of a commercial preparation known as Varnish Remover, which may be obtained from almost any dealer in paints. Ammonia has also been successfully used in removing varnish.

AMOUNT OF COMPRESSION SPACE

Dallas, Tex.—Editor Motor Age—Through the Readers' Clearing House will Motor Age tell me what should be the height of the compression space to gain 75 pounds compression in a 5 by 6-inch four-cycle single-cylinder gas engine of the motor car type? In the engine one valve is in the head, the other in the side, the weight, diameter and face approximately of the flywheel. Should the intake valve remain open during one stroke of the piston? What is the difference between a timer and a distributer? In a thermo-syphon cooled engine, are the water pipes larger than in an engine cooled by a pump?—Jules D. Roberts.

In order to get compression of approximately 75 pounds from a motor, the distance from the top of the piston to the top of the combustion chamber should be 1.33-inch. It is difficult to state the weight of the flywheel without knowing the speed at which you want the motor to operate, and whether it is for stationary or motor car use. It is customary to open the intake valve a little after the top dead center and hold it open considerably past the bottom dead center. The difference between a timer and distributer is that the timer is in the primary circuit of an ignition system in which the voltage is the voltage of the battery; whereas, the distributer is in the secondary current, or between the coil and the spark plugs. In a distributer the voltage of a secondary current may be from 25,000 to 35,000. In the majority of thermo-syphon systems the pipes are of larger diameter than where a water pump is used. In Renault cars, which are cooled by thermo-syphon, the pipes are easily two and one-half times in diameter what they are in similar cars with water pumps. Some manufacturers using thermo-syphon cooling instead of abnormally increasing the size of the water pipes use a radiator which is of from 25 to 30 per cent greater capacity than they would use if a water pump was fitted. Designers of thermo-syphon cooling systems all work on the line of larger radiator capacity and generally with larger radot spaces and water pipes.



ROBERTS MOTOR DESIGN, REFERRED TO ON THIS PAGE

Manufacturing Magnetos

FIG. 1—FOUNDRY IN WHICH MAGNETOS ARE MANUFACTURED

BEFORE telling in simple facts how the manufacture of a Remy magneto is carried on, it may be beneficial for readers not familiar with a magneto to analyze briefly this little current-producer, drawing attention to its various parts and their respective functions. Fig. 2 shows the major elements, those making the current, M marking two of the six horseshoe magnets, C the stationary coil winding, S the rotating shaft and R the two drop-forged rotors pinned thereon. The open ends of the magnets span the rotors, and it is the alternating of the lines of force between the north, N, and the south, S, ends by the rotor that creates the current in the coil C. This current is of low voltage, too low to jump the gap in the spark plug with sufficient force to ignite the mixture. To increase the voltage the current is conducted through the breaker mechanism to a step-up transformer coil inclosed in box B, Fig. 6, in which box also is carried the condenser. At B in this illustration is the breaker box, W indicates the breaker mechanism for making and breaking the circuit as it leaves the magneto. In Fig. 4, the partial assembly of the magneto is illustrated, showing the high-tension distributor HD, by means of which the current returned from the coil carried on the dash is delivered to the four plugs. Also shown are such parts as the distributorshaft T, the gears which drive it, and oiling arrangements. This illustration further discloses the body part, consisting of a top plate P held in place by screws, a bottom plate P1 right and left pole pieces, front and rear end pieces E and E1, and other small parts.

Segregation of the Work

When a concern like the Remy Electric Co. manufactures as high as 1,100 magnetos a week, the organization calls for the perfect segregation of work. Each of the 300 men must do his own work and nothing else. The entire plant is divided into compartments. One building is devoted exclusively to the manufacture of magnets; in another department, the hard rubber insulation for the distributor box and other parts is made; in a third department, the stationary coils are wound; in

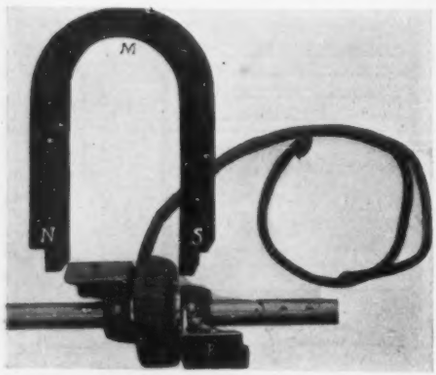


FIG. 2—ESSENTIALS OF MAGNETO

FIG. 3—WINDING STATIONARY COILS

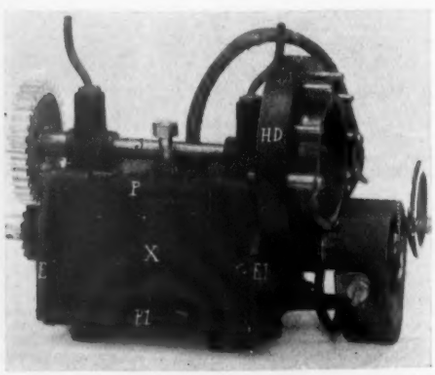


FIG. 4—MAGNETO ASSEMBLY

FIG. 5—TIGHTENING RUBBER MOULDS

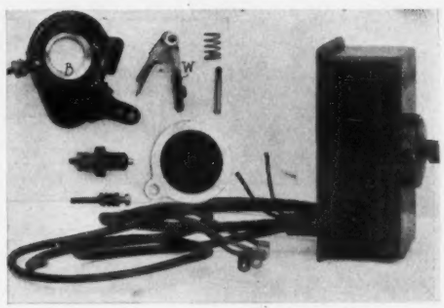


FIG. 6

FIG. 7—MAKING RUBBER INSULATION

a fourth, the condensers are manufactured; in a fifth, the machining of the different parts is accomplished; in a sixth, the assembling of the different manufactured parts of the magneto takes place; in a seventh, the painting is done; in an eighth, the complete magneto is tested; and lastly, in a ninth, it is crated and made ready for shipment. Each department has its quota of men; each man in a department does his own particular work.

Making of the Magnets

One of the first departments visited, in an afternoon round of the plant, was the foundry, housed in a separate building, and in which seventeen men are engaged in the manufacture of the magnets. A weekly output of 1,100 magnetos means an output of 6,600 magnets, in that there are six to a magneto, so that 1,100 magnets is the daily output. First the special alloy steel, out of which the magnets are made, reaches the foundry in long bar lengths, and one man, by means of a machine not unlike a giant meat cutter in a grocery store, cuts the bar into lengths 13½ inches each, at the rate of sixteen cuts a minute, each cut being long enough to form a magnet. These magnet-lengths are taken to a heating furnace and brought to a rosy red, after which they are bent into horseshoe form; two men performing the work, the machine being a long arm hinged at one end and with a roller on it, which roller, as the arm is swung through a radius of 180 degrees, bends the magnet-length around a horseshoe form. It requires but 25 seconds for the two men to bend each magnet and a double gang is employed. Immediately it is bent it is transferred to an inspector who, with rules and gauges, determines if it is of accurate form, measuring across the open end, besides ascertaining if the arms of the magnet are parallel. The magnet is now permitted to cool before passing to a group of four men who grind the inner faces of the open ends, across the ends, and at other points so that they will fit accurately and closely on the body of the magneto. Next the magnet goes to the furnace where it is brought to a red heat and immediately dipped in water, this latter process hardening it. A short buffing process of 45 seconds to a magnet follows, in which the surfaces are cleaned by rotary buffers, after which they are

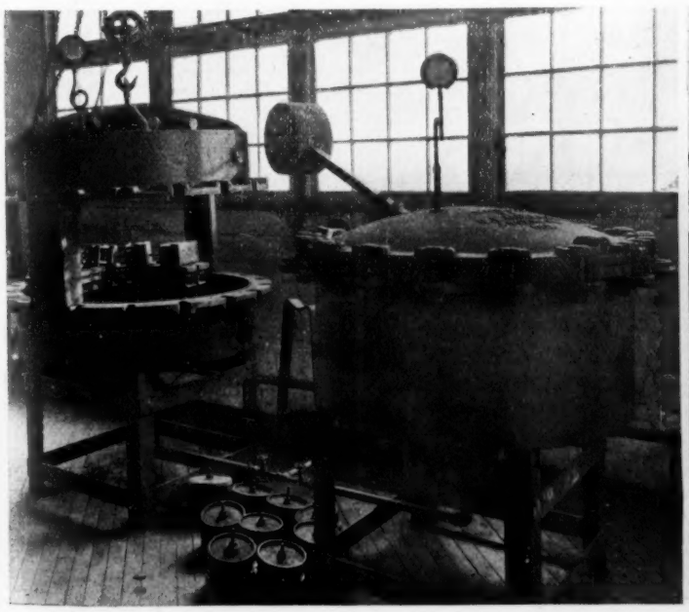


FIG. 8—WHERE RUBBER PARTS ARE VULCANIZED

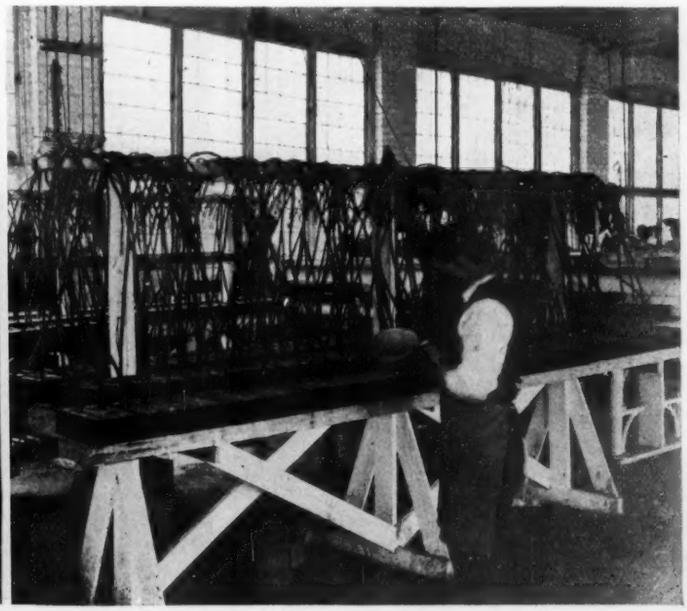


FIG. 9—POURING WAX INTO COIL BOXES

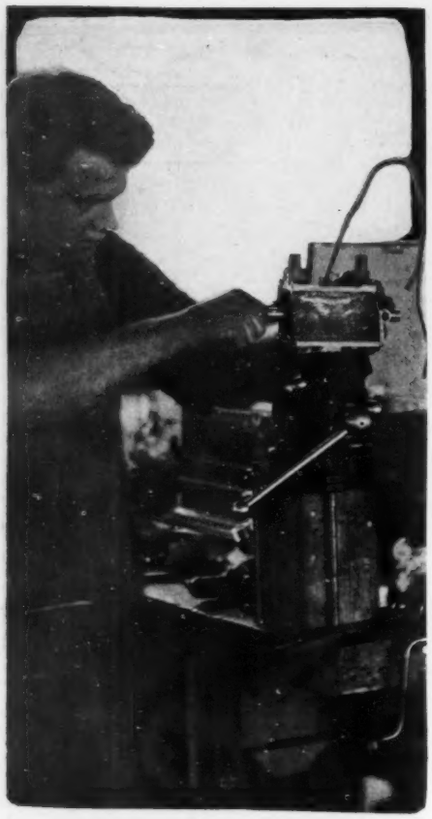


FIG. 10—ASSEMBLING MAGNETOS

dipped into the paint vat by one man.

The magnet is now complete, but without magnetism, and 36 seconds more are needed to instill into its steel the magic qualities of the permanent magnet, namely, that of attraction. Although this is a short process it is equally simple. The magnet is fitted in a rack so that one end is in a wire coil which is wound from left to right and through which a current of electricity passes, and the other end in a coil wound from right to left through which the same current passes. The magnet is now done, and although first completed is practically the last thing to be added to the instrument in the course of assembly.

The winding of the stationary coil C, Fig. 2, is accomplished by two men, each of whom, Fig. 3, sits at a hand reel, the right hand rotating the reel, and the left guiding the wire which is taken from a large reel behind the workman and is wound similar to thread on a spool, the utmost care being taken to insure complete regularity as well as an accurate number of layers, the number being the same in every instance. When completed the coils are much as shown in the lower part of Fig. 3, but the coil in this form is not ready for the assembler; it must go into the hands of three workmen. The first adds the long cables, shown in Fig. 6, to the two loose ends of the coil winding; the second carefully wraps the joint; and the third completely takes the whole coil and wraps it as illustrated, after which it is shellacked and baked to render it waterproof, which is highly necessary.

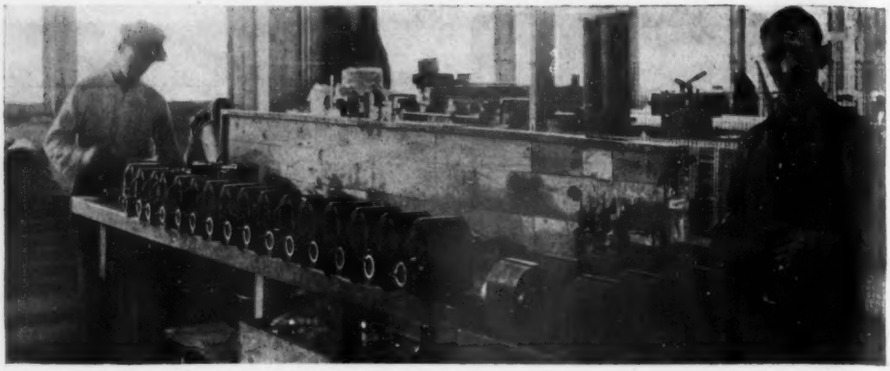


FIG. 11—PAINTING MAGNETOS

The coil is now ready for the instrument.

Thirteen to fifteen men under a superintendent are constantly busy in the rubber department, manufacturing the distributor box HD, Fig. 4, the distributor cover, the segment for the rotating part of the distributor, and other insulating parts. Fig. 7 shows workmen packing the rubber, which has been taken off of the warm oven in front of them, into molds to form the distributor cases, and in Fig. 5 the work is complete and the workman is tightening the cover on the mold. This done, the molds are put in large vulcanizing tanks, Fig. 8, where they are for a certain time subjected to steam pressure, and, immediately after being taken out, removed from the molds and allowed to cool. Gauges on each vulcanizer insure the proper steam pressure within each. In making the distributor box the four wires, for conducting the current to the four segments, are imbedded in the mold and the rubber packed around them.

Machine Shop Work

The remainder of the magneto proper is largely a repetition of regular machine shop practice in which the different parts are separately machined to the required size, all the holes drilled for shafts and screws, parts finally gone over with file and scraper to remove roughness, after which they are ready to be assembled. In this work multiple operations rule; thus at one machine eight base plates have the edges milled simultaneously; at another point the inside faces of the pole pieces are arced by a rotating cutter, one man looking after two automatics performing this work—the pole pieces being secured to the top and bottom plates during the operation. This done, the ends of the top, bottom and pole pieces are milled off, one man performing the work with a machine.

At another machine, in the progression of manufacture, the bottom of the feet on the base plate are milled off, so that the instrument will sit level on a motor.

A succeeding operation is drilling five holes in the end piece all at once by a multiple drill, which is immediately followed by similarly drilling holes in the opposite end piece. Four of these holes are for screws to hold the end plate to the top and bottom plate, and the fifth for the rotorshaft. Still, the progression of machining continues. The rotor arms R, Fig. 2, are drilled to go on the rotorshaft. At another place the curved top is machined so as to properly rotate between the

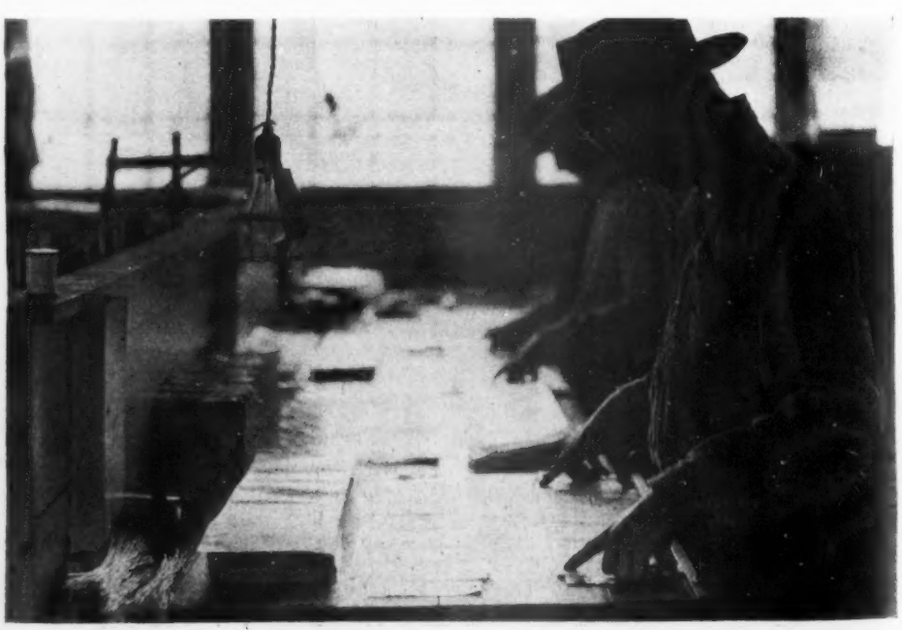


FIG. 12—MANUFACTURING CONDENSERS FOR COIL BOXES

FIG. 13—WORKING IN THE COIL DEPARTMENT

pole pieces, accuracy being needed here on account of the small air gap between these rotors and the pole pieces. At another point the breaker box is being machined from the rough casting, and later a man devotes all of his time to drilling the ten holes required in each.

Next comes the assembly of the various completed parts to make up the instrument, it requiring a progression through a dozen to fifteen men before the magneto is ready to be conveyed to the testing block. From the machine shop the pole pieces, end plates and top and bottom plates come loosely assembled, and No. 1 assemblyman smooths off the screw heads, so that when they are in place there will be no sharp points protruding. No. 2 assemblyman scrapes off the inside of the pole pieces and cleans the parts up generally, besides fitting the inductor into place. No. 3 screws on the end pieces. No. 4 fits the distributor case, the rotating distributing disk and adds the wick oilers for the distributorshaft. No. 5 fits the double cam on the rotorshaft in the breaker box and in fitting it he is careful to file off the heads of the pins holding it in place and any threads that might have become bruised during the operation. No. 6 puts the fiber gears on the rotorshaft through which the distributorshaft is driven, then adds the bronze gear on the distributorshaft and pins it in place. To No. 7 falls the duty of adding the distributor cover, seeing that the distributor disk is in proper location, and slightly separated from the contact points. He also adds the breaker box cover, inspecting, however, the different parts to see that they are in working condition. Four men are engaged in assembling the different parts and the make-and-break mechanism within the breaker box.

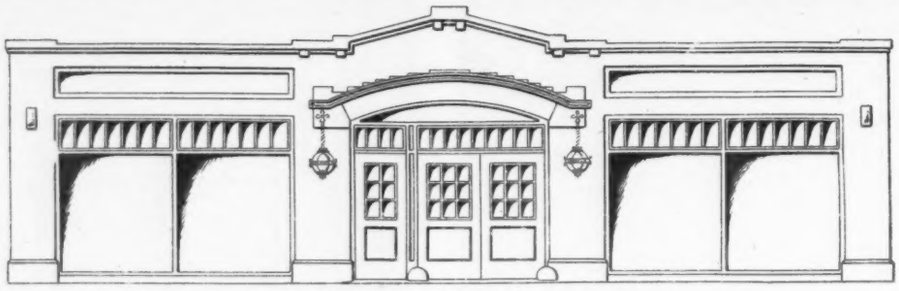
Before passing to the testing of the magneto a brief digression is necessary for the manufacture of the step-up transformer coil and condenser which is incorporated within the coil box. The coil with its primary and secondary winding is already wound when it reaches the factory, but has to be inserted in the coil box and imbedded in wax. To the side of it is the condenser which is manufactured at the plant. Three men do the work, laying alternate layers of paraffin paper and tin foil, sheet upon sheet, until the required number is had; then, the alternate slips of tin foil are united at one end, which extends beyond the paper by a copper clamp to which a copper wire is attached. This done, the sheets are folded several times until of convenient size to be placed in the coil box. The condenser receives the usual attention, after which it is deposited in the coil box and properly wired. Fig. 12 shows the condenser manufacture, laying of the tin foil and paper, and in Figs. 9 and 13 are views of the coil department, Fig. 9 showing the pouring of the wax in the coil boxes and Fig. 13 the securing of the switch mechanism on the face of the box.

Lastly, comes the testing of the magneto. It is first tested to note the spark at a speed of 150 revolutions per minute, the object being to see if there is sufficient intensity at this speed. Following this the intensity of the spark for each of the four plugs is tried, an adjustable gap contrivance being used which permits of separately opening each of the several gaps if desired to determine if all four sparks are uniform. This tests the insulation of the distributor, as well as determining if all its parts are in working order. This done, each of the four spark gaps is abnormally separated, making it impossible for the spark to jump, and the distributer mechanism is watched to see if there is any break in the insulation at such time. This is the slow speed test. The magneto is then run at a speed of 1,500 revolutions per minute and similar tests given. It might be added here that previous to the insertion of the coil in the coil box, it is tested to see if there is any short-circuiting in either of the coil windings, and when such occurs the coil is rejected.

FIG. 14—IN MAGNETO MACHINE SHOP

FIG. 15—INSPECTING MAGNETO

HINTS ON THE CONSTRUCTION OF GARAGES



FRONT ELEVATION OF KRAMER MOTOR CO. GARAGE

AN American town or village without its garage is a novelty in these stirring days when the motoring industry is increasing its prosperity day by day and year by year. A town without some sort of motoring accommodations is without representation on the map. Some of these garages hardly can be dignified by the name, in many instances old livery stables being used. But as the horse is gradually being forced into the background and the car becomes the thing, the keeper of a garage realizes that to properly care for his trade he must have a building that is specially erected for this purpose—that makeshifts are poor economy.

Looking over the field in Chicago, one finds many new garages being built in which considerable money is expended and upon which the owner has given considerable thought as to motoring conveniences. One of these is to be found at Sheridan road, Evanston avenue and Montrose boulevard, the building being constructed in a triangle which is bounded by the three streets named. The Kramer Motor Car Co. built it and here, it would seem, is something approaching the ideal in that it not only provides an up-to-date garage, but also offers a chance to sell cars, the Kramer company maintaining an agency.

This garage represents an investment of $27,600. In a small town this would not run into so much money because land would be cheaper. For its lot, which is 66½ feet wide and 160 feet deep, the Kramer company paid $9,000. The building represents $13,700, while the equipment runs up to another $3,000. It is a one-story building made of brick, with a cement floor and is capable of accommodating sixty cars. In the front of the building is located the office and the salesroom. The former is on the left side going in. Directly off of it is the wardrobe room with its racks and shelves, the women's toilet, the stock room and the men's toilet. On the right hand is the salesroom, which is 29 by 30 feet and large enough to display two cars and a stock of accessories. Between the salesroom and the office is the entrance to the garage, which is 13.8 feet in width, and a cement runway leading from the street. The walls and ceilings are pine-painted and the runway is 29 feet in length. Sliding doors are used in the garage proper.

The main room in which the cars are kept is a big affair, a little longer on one side than on the other because of the repair shop, pit room and wash rack which take up two-thirds of the rear end of the building. Therefore, this gives a length of 89 feet on the right side for the storage of cars and 111 on the other. There are four big skylights and eight posts in the room and around the sides of the building are ranged the sixty lockers. There are six steam coils which supply heat the year round.

Located in the front of the building and next to the salesroom is the supply of gasoline and oil, the tank for the gasoline being buried in the ground in front of the building. This tank has a capacity of 1,100 gallons, while ten barrels of oil can be carried in stock.

When Mr. Kramer built this garage late last summer he fancied he had struck ideal conditions, but since then he has become convinced that an improvement can be made. Therefore he intends adding another story this spring, which will give him twice his present capacity. He will move the repair shop upstairs and will use the old repair shop for a stock room. In putting the repair shop on the second floor, the theory is that when it is on the main floor chauffeurs and others are continually borrowing tools and when they are refused they become angry. It also has been found that the shop must have a stock room and a boy to keep the stock, for the repairman cannot charge material on the time card. Also there is needed a customers' stock room in which oil, tires, etc., may be kept which either are too large or too dirty to go in the lockers. The ideal garage also has a closed office with a cashier's window and loiterers should be kept away from the front of the building as well as from the salesroom.

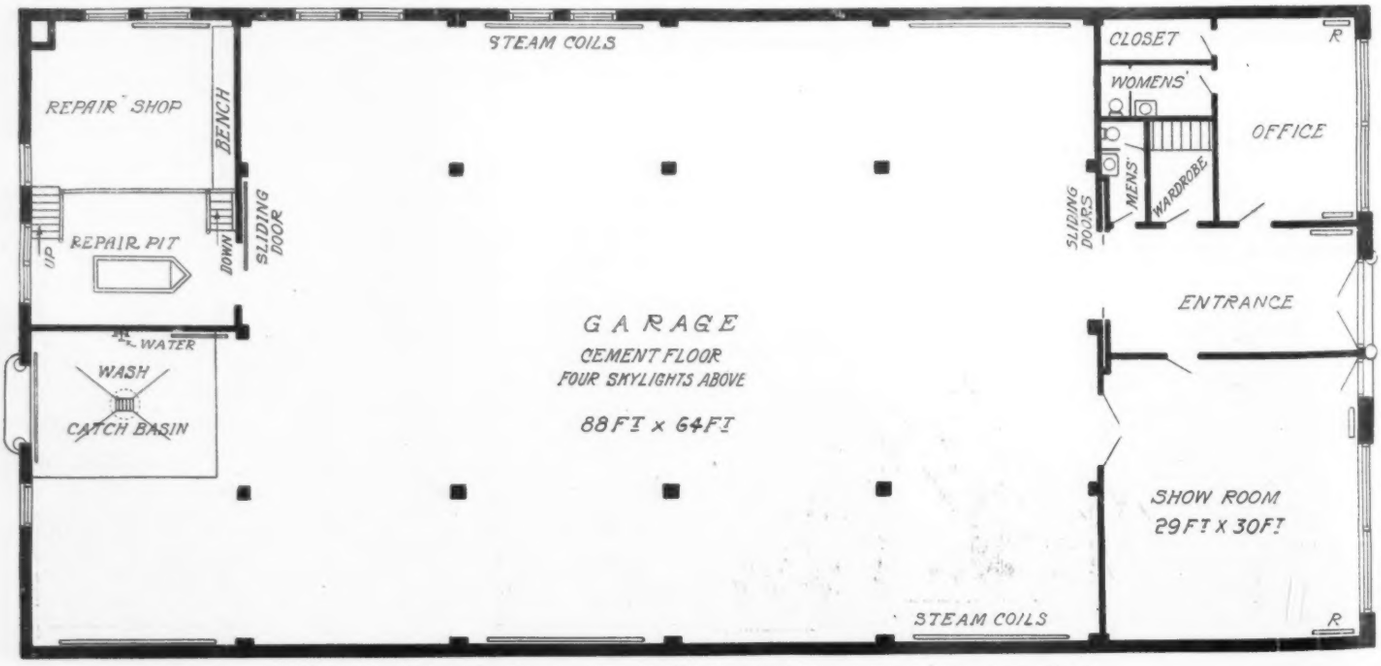


DIAGRAM OF FLOOR PLAN OF CHICAGO GARAGE CAPABLE OF CARING FOR SIXTY CARS

CHARGING OF ELECTRICS FOR CITY USE

THE relation between the garage man, handling electric vehicles, also private owners using such vehicles, and the central station ought to be of the most cordial kind. The territory around Chicago is particularly well suited to the use of electric vehicles. The many miles of well-paved boulevards all over the city and surrounding country make the conditions for the use of such vehicles ideal. It is reported that there are approximately 3,000 electric vehicles in Chicago, the majority of which are used for pleasure purposes.

While at the present time the majority of the garages in Chicago are catering to the pleasure vehicle trade, no doubt the greatest future growth will be in connection with the commercial electric truck. Information compiled as to the cost of operating this type of wagon indicates that the cost of maintenance is cheaper than horse-drawn vehicles.

One Objection Overcome

One of the handicaps in the charging of electrics in outlying territory has been that the central station lines have served only alternating current, and the cost of transforming this energy, with the use of motor generator outfits, has been excessive on account of the low efficiency of the apparatus. With the development of the mercury arc rectifier, this objection has been reduced; the efficiency of these rectifiers being considerably higher than that of the motor generator set under the ordinary working conditions. The direct-current territory is approximately from North avenue to Thirty-ninth street and west to Ashland. The current can be used direct for charging by the use of a resistance box to reduce the voltage.

The Commonwealth Edison Co. has established a maximum rate of 5 cents per kilowatt hour for electric current used for charging in public garages. The consumer can earn a lower rate than this on its Wright demand system of charging where his conditions are such that he can charge long hours.

Where customers have complained of a high rate, the cause is due to the fact that the consumer was a short-hour user. If it is possible for public garages to so operate that they can charge long hours at a low demand, the rate for energy for this class of service goes to a very low point. For instance, with a maximum of 15 kilowatts, 10 hours per day, the rate is as low as 3¼ cents per kilowatt hour, with a corresponding reduction for larger installations and longer hours' use. Should the garage be able to charge for 15 hours per day, the rate on 15 kilowatts demand would be slightly under 3 cents per kilowatt hour.

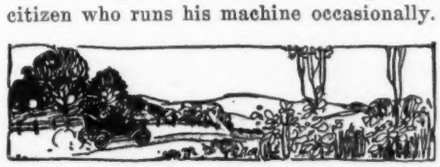
As the average charging time for vehicles is about 4 hours per day, at approximately 3 kilowatts per battery, it seems reasonable to suppose that by charging 25 or 30 per cent of the total number of vehicles stored such a garage should be able to use the maximum about 12 hours per day, thus earning a rate that makes the business profitable to the garage owner. Assuming a full charge of 4 hours every day for the ordinary pleasure vehicle, and at the rate above mentioned, the cost per charge would be about 35 cents, with a maximum cost of 60 cents, at 5 cents per kilowatt hour.

Curves show the way the rate per kilowatt hour reduces with the different hours' use of 10, 15, 20, 30 and 50 and 100-horsepower outfits.

So far as I know, the rate for the charging and keeping of electric pleasure vehicles in Chicago is between $30 and $40 per month. This includes the storing, cleaning and charging of the machine. This method of charging does not appear to me as being the correct one, because it is not equitable. Where customers have gasoline cars, the owner pays for all gasoline and lubricating oil used. Therefore, I do not see why it is not legitimate for owners of electric cars to pay for the electricity used by his car each month. The equitable way to charge for this service would be to have a fixed barn charge for the storing and cleaning of the machine, and a secondary charge based on the miles run per month. It would be easy for one to determine the cost of charging the average machine, and by changing the secondary charge to a mileage basis the customer will more readily understand how the garage man arrives at this charge than if he charged him at a rate per kilowatt hour. On the average, one can estimate a pleasure ride takes 4 kilowatt hours per mile. If the garage man does not care to do this, he could have a fixed price per complete charge. The objection to this second method is that it is not always necessary to deliver a full charge to a machine, and on this account this method would not always be absolutely fair, although, on account of the difference in mileage of different machines on the same charge, this last method may be the best one.

Rates Are not Equitable

It does not seem proper that a doctor having an electric runabout, used many miles per day, should have the service at the same price per month as a private citizen who runs his machine occasionally.



The above scheme or something similar has been tried, but failed for lack of coöperation among garage owners. If the garage man determines to base this charge on so much per mile, even this should not be a flat secondary charge, but ought to be varied according to the mileage per month. For instance, up to and including 100 miles per month, so much per mile; from 100 to 300 miles per month, a slightly lower charge per mile, and from 300 to 500 miles per month, a still lower charge per mile, and so on. The reason for this basis being that the cost of charging for low mileage users is higher per kilowatt hour than for a frequent user, even with one's own plant. Short mileage users compel the garage man to run his charging apparatus intermittently and short hours per day. In that case the overhead costs on the plant are larger per unit than where the keeper can charge long hours per day.

Basis of Charging

The basis of charging by the central station for electrical energy is along these same lines, and is perfectly logical, because it costs exactly the same for fixed charges per kilowatt demand for the man who uses the current 1 hour per day as it does for the man who uses it 24 hours per day. For the operation of the apparatus, the cost of fuel and supplies varies directly with the amount of energy required. One can, therefore, more readily afford to sell to the long-hour users at a very much lower price than he can to a man who is a short-hour user.

I have some figures on a few customers, showing the general results during the month of February. These figures point out that the average charging time of these public garages on our system during that month was only 5 hours. Of course, this is due somewhat to the time of the year, as in summer time the time of charging is no doubt considerably longer. On account of the particularly good weather during the month of February this year, the use of electric vehicles was much greater than usual, so it can be seen that during a bad winter the charging time during the month of February would be considerably under 5 hours under present conditions. However, in the summer time, when the garage man is put to the most expense for electricity, conditions are such that it seems reasonable to suppose that he could charge very long hours by slightly rearranging his business. If, under present conditions, it is necessary to charge a flat rate per month for electric vehicles, one should be able to so draw agreements with his customers that he will be allowed a reasonable time for charging. As the battery men will no doubt point out, it is better for customers' batteries to charge at a low rate for long hours.

EDITOR'S NOTE—This paper was read by E. W. Lloyd, of the Commonwealth Edison Co., at the Exide battery meeting in Chicago, March 31, 1909.

ELECTRICAL DEVICES USED IN MOTOR CARS

By Thomas J. Fay

Part III

IN electricity there are four prime considerations: What takes place in the electrical circuit proper; the functions of magnetic circuits; electro-magnetic phenomena, and electrochemical work, from the battery point of view. Each one of these phases will have to be discussed separately, and in detail, before it will be possible to proceed further. The electrical circuit, in turn, must be subdivided in the manner as follows: Direct current circuits, as when a battery or a commutating dynamo current is used, and alternate current circuits, as when a magneto is used.

Specific Resistance of Conductors

No matter what may be the nature of the current the circuit must be of a conducting medium, as a metal, an alloy of metals, carbon, compounds in which carbon predominates, and electrolytes, as water, in which sulphuric acid or some salt of metals is placed. The following table gives the specific resistance of conductors:

METALS

Substances	Resistance*
Copper—annealed	0.0157
Copper—hard	0.0160
Silver—annealed	0.0149
Silver—hard	0.0162
Gold	0.0208
Aluminum—annealed	0.0289
Platinum	0.0898
Iron—pure	0.0964
Iron—telegraph wire	0.15
Lead	0.1963
Mercury	0.9434
ALLOYS	
German silver—	
Cu. 60, Zn. 26, Ni. 14	0.2076
Platinoid—	
Cu. 59, Zn. 25.5, Ni. 14, W. 55	0.325

* In this table the resistances, in ohms, of metals are for conductors 1 meter long and with an area of section 1 millimeter square.

In the table for the specific resistance of liquids, as follows, the specific resistances are given for a centimeter cube, while the resistance is given in microhms:

Liquids	Resistance
Pure water	26.5x108
Dilute sulphuric acid—5 per cent.	486x104
Dilute sulphuric acid—30 per cent.	137x104
Dilute sulphuric acid—80 per cent.	918x104
Dilute zinc sulphate—24 per cent.	214x105
Dilute nitric acid—30 per cent.	129x104

Measuring Ohmic Resistance

The resistances are on a basis of a direct current, thus measuring the ohmic resistance in the absence of any interference, such as that due to inductance and capacity. The resistance of any conductor is not the same at all temperatures, and in the tables as above given, the resistance for metals is at 0 degrees Centigrade, while for liquids, the temperature was 18 degrees Centigrade. For metals the resistance in ohms increases as the temperature increases, and the formula used in the determination of the temperature coefficients is generally stated as follows:

$$Rt = Ro\ (1 + \theta t + B t^2)$$

Rt = resistance in ohms, at the final temperature,

Ro = resistance in ohms, at the standard temperature,

t = increase in temperature, in degrees Centigrade,

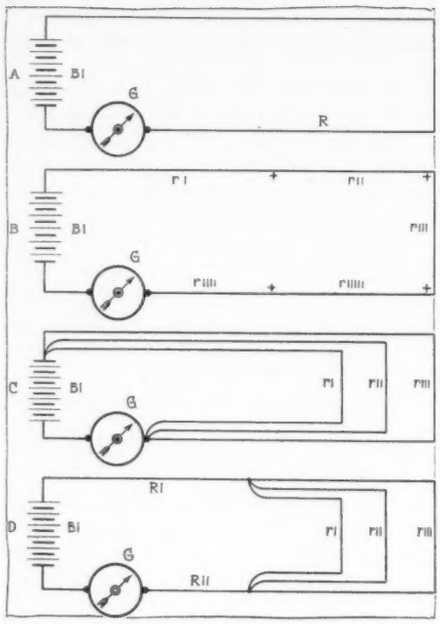


FIG. 7

B = a coefficient,

θ = another coefficient.

In ordinary work it is enough to use the modified formula thus:

$$Rt = Ro\ (1 + \theta t)$$

The values of θ are given as follows, for degrees Centigrade:

Metals	θ Values
Silver	0.00377
Copper	0.00388
Gold	0.00365
Aluminum	0.00390
Platinum	0.00247
Iron	0.00453
Tin	0.00365
Lead	0.00385
Mercury	0.00088
German silver	0.00028—0.00444

Example of Formula

As an example of the use of the formula, a case will be assumed, as follows:

Let

Ro = 20 degrees Centigrade = 35,087.72

Rt = 40 " "

t = 20 " "

Metal = copper

θ = 0.00388.

When,

$$Rt = 35{,}087.72\ (1 + 0.00388 \times 20) = 37{,}810.52$$

As will be understood, the difference between the resistance cold, 35,087.72, and 37,810.52, which is the hot resistance, in this case, is enough to cause failure, if the increase in resistance, due to temperature, is not taken into account. It is impossible to make any headway, in this process, in the absence of a table of the properties of the metal it is proposed to use. Since copper is the universal metal for conductors—not forgetting that aluminum wire has a place in certain classes of electrical work—it will be well to insert a table, giving the properties of copper wire, as follows. This table appears at the bottom of the following page.

No Electric Manifestation

Since the electrical circuit is not without resistance, it follows that there will be no electrical manifestation in the absence of a potential to overcome the resistance. Then, there is electrical interia, capacity, inductance, and since energy is never reduced, considering a certain universal total, some of the energy is dissipated in the form of heat, a little in sound manifestations, and in certain other molecular work besides. The C.G.S., centigrade-gram-second system of absolute units is the basis of all computations, and the practical system of units hold to the following relations:

Name	Definition	Symbol
Volt	Unit of electromotive force	E
Ampere	Unit of current density	I
Ohm	Unit of resistance	R
Watt	Unit of power	W
Joule	Unit of work	J
Coulomb	Unit of quantity	Q
Farad	Unit of capacity	K
Henry	Unit of inductance	L
Calorie	Unit of heat	h

$$E = I\,R = \frac{W}{I} = \sqrt{\frac{W}{R}} = \text{electromotive force in volts.}$$

$$I = \frac{E}{R} = \frac{W}{E} = \sqrt{\frac{W}{R}} = \text{current in amperes.}$$

$$R = \frac{E}{I} = \frac{W}{C^2} = \frac{E^2}{W} = \text{resistance in ohms.}$$

$$W = E\,I = I^2\,R = \frac{E^2}{R} = \text{power in watts.}$$

$$J = E\,I\,t = I^2\,R\,t = \frac{E^2}{R}t = \frac{h}{0.24} = \text{work in joules.}$$

$$L = \frac{T\,S\,\theta}{10^8} = \text{in which, T = turns of wire on a rotor; S = speed of the rotor, in revolutions per second; O total magnetic flux emanating from one pole of the magnetic field, hence the inductance, L, in henrys, expressed in volts, which is a method of convenience.}$$

$$h = E\,I\,t \times 0.24 = I^2\,R\,t \times 0.24 = \frac{E^2}{R}t \times 0.24 = \text{heat in calories.}$$

Designing of Magneto Armatures

Since it is the inductance in henrys or in volts that serves as the connecting link between the electric system and the magnetic circuit, particular reference will be made to this unit in connection with the designing of magneto armatures, and it will be well, if the interested reader will study the situation and get used to expressing the value of the unit in volts, rather than in henrys, which license will be more than justified, in view of the ease with which the unit will be understood, and the extent it will serve an important purpose.

When Dr. G. S. Ohm formulated Ohm's law, the functions of the electrical circuit were rendered perfectly clear, and a means

was at once provided for determining the values of the units in concrete figures. Prior to that event, it was always a cut-and-try proceeding, and the results were never so good as to be looked upon as permanent.

Wording of Ohm's Law

Ohm's law may be stated thus: "The strength of the current varies directly as the electromotive force, and inversely as the resistance of the circuit." Taking advantage of the practical electrical units, and the names by which they are now known, the law can be re-stated as follows: The current density, in any circuit, in amperes, is directly proportional to the electromotive force in volts, and inversely proportional to the resistance of the circuit in ohms. In any circuit then, as the algebraic expression states, the current density is equal to the electromotive force in volts, divided by the resistance in ohms; or, to the power in watts, divided by the electromotive force in volts; or, to the square root of the power in watts, divided by the resistance in ohms.

In a battery the voltage of one cell will be the electromotive force of the circuit, but if there is a number of such cells in series, the voltage will be the electromotive force of one cell, multiplied by the number of such cells. This is with the proviso that all the cells are so connected that they do not oppose each other; if one cell is connected in reverse the voltage of that cell must be subtracted, or, if one cell is below voltage, due to some defect, the difference must be subtracted. In other words, the algebraic sum of voltages, in series, will equal the voltage of the circuit. If, on the other hand, a number of batteries are connected in parallel, the voltage of the circuit will be equal to the voltage of one cell. In this case, the internal resistance of the battery will be equal to the joint resistance of the number of cells in parallel, and the current capacity will be increased, directly as the number of cells in parallel.

Algebraic Expression

Considering a series of voltages, the algebraic expression becomes,

$$I = \frac{e' + e'' + e''' + e'''' + \ldots\ldots}{r' + r'' + r''' + r'''' + \ldots\ldots}$$

When,

I = intensity of current in amperes,

$e' + e'' + \ldots\ldots$ = the separate voltages in series,

$r' + r'' + \ldots\ldots$ = the separate—corresponding—resistances in ohms.

Since there is absolutely no case which will warrant the placing of cells in reverse, excepting in storage battery work, in which counter-electromotive force cells are sometimes used, the discussion of this phase of the subject will be limited to a statement of the facts, during the discussion of the storage battery.

Considering the resistance in ohms of a battery, generator, or circuit, it is frequently the practice to add resistances, both in series, and in parallel. For the resistances in series, the sum of the separate resistances will be equal to the combined resistance of the circuit, namely:

$$R = r' + r'' + r''' + r'''' + \ldots\ldots$$

When,

R = resistance—combined—in series,

$r' + r'' + \ldots\ldots$ represent the respective separate resistances of which there may be any number.

If, however, the resistances are placed in parallel, the joint resistance of the branches in parallel will be less than the resistance of the respective branches, or any one of them; the rule for which is: "In a divided circuit, the joint resistance will be equal to the reciprocal of the sum of the reciprocals of the respective branches." An algebraic expression of this law is as follows:

$$R = \frac{1}{\frac{1}{r'} + \frac{1}{r''} + \frac{1}{r'''} + \frac{1}{r''''} + \ldots\ldots}$$

When,

R = joint resistance in ohms of the parallel system of circuits.

$r' + r'' + r''' + r'''' + \ldots\ldots$ = resistance in ohms of the respective branches of which there may be any number.

Circuits in Branches

Circuits can be made up of branches in parallel or in series, and it is also true

PROPERTIES OF PURE ANNEALED COPPER WIRE FOR ELECTRICAL USES

Specific Weight = 8.99 — PURE COPPER WIRE

B & S Gauge No.	Dimensions: Diam Inch	Area Cir. Mils	Insulation (Cot. Cov-) Diameter: Sing. Cov.	D'ble Cov.	WEIGHT: Lbs. per ft.	Lbs. per Ohm; at 20° C	at 50° C	at 80° C	LENGTH: Ft. per lb.	Foot per Ohm. at 20° C	at 50° C	at 80° C	RESISTANCE: Ohms per lb. at 20° C	at 50° C	at 80° C	Ohms per Foot at 20° C	at 50° C	at 80° C	PERMISSIBLE CURRENT at 7° C Rise	at 10° C Rise	at 20° C Rise
0000	.460	211600	.....	.....	.6405	13090	11729	10570	1.561	20440	18290	16510	.00007639	.00008535	.00009459	.00004893	.00005467	.00006058	182.51	218.19	308.69
000	.4096	167800	.....	.....	.5080	8232	7369	6647	1.969	16210	14510	13090	.0001215	.0001357	.0001504	.00006170	.00006893	.00007640	153.11	186.09	263.19
00	.3648	133100	.....	.....	.4028	5177	4634	4182	2.482	12850	11500	10380	.0001931	.0002158	.0002391	.00007780	.00008692	.00009633	128.44	153.55	217.17
0	.3249	105500	.3349	.3449	.3195	3256	2914	2630	3.130	10190	9123	8232	.0003071	.0003431	.0003803	.00009811	.0001096	.0001215	107.85	128.93	182.35
1	.2893	83690	.2993	.3093	.2533	2048	1833	1654	3.947	8083	7236	6528	.0004883	.0005456	.0006046	.0001237	.0001382	.0001532	90.82	108.57	153.55
2	.2576	66370	.2666	.2756	.2009	1288	1153	1040	4.977	6410	5738	5177	.0007765	.0008675	.0009614	.0001560	.0001743	.0001932	76.01	90.94	128.61
3	.2294	52630	.2384	.2474	.1593	810	725	654.2	6.276	5084	4550	4106	.001235	.001379	.001529	.0001967	.0002198	.0002435	64.07	76.51	108.35
4	.2043	41740	.2133	.222	.1264	609.4	455.9	411.4	7.914	4031	3608	3256	.001963	.002193	.002431	.0002480	.0002771	.0003071	53.60	64.08	90.62
5	.1819	33100	.1909	.200	.1002	320.4	286.7	258.7	9.980	3197	2862	2582	.003122	.003487	.003865	.0003128	.0003495	.0003873	44.94	53.73	75.99
6	.1620	26250	.170	.178	.07946	201.5	180.3	162.7	12.58	2535	2269	2048	.004983	.005545	.006145	.0003944	.0004406	.0004883	37.94	45.33	64.12
7	.1443	20820	.1523	.160	.06302	126.7	113.4	102.3	15.87	2011	1800	1624	.007892	.008817	.009772	.0004973	.0005556	.0006158	31.48	37.64	53.23
8	.1285	16510	.1355	.142	.04998	79.69	71.33	64.36	20.01	1595	1427	1288	.01255	.01402	.01554	.0006271	.0007007	.0007765	23.40	27.98	39.58
9	.1144	13090	.1204	.126	.03963	50.12	44 86	40.48	25.23	1265	1132	1021	.01995	.02229	.02471	.0007908	.0008835	.0009791	21.88	26.16	37.00
10	.1019	10380	.1069	.112	.03143	31.62	28.21	25.46	31.82	1003	897.6	809.9	.03173	.03545	.0928	.9009972	.001114	.001235	18.49	21.80	31.26
11	.09074	8234	.0957	.101	.02493	19.82	17.74	16.01	40.12	795.3	711.8	642.3	.05045	.05636	.06246	.001257	.001405	.001557	16.45	18.27	26.12
12	.08081	6530	.0858	.091	.01977	12.47	11.16	10.07	50.59	630.7	564.5	509.4	.08022	.08962	.09932	.001586	.001771	.001963	13.16	15.94	22.26
13	.07196	5178	.0765	.081	.01568	7.840	7.017	6.332	63.72	500.1	447.7	404.0	.1276	.1425	.1579	.001909	.002234	.002476	10.94	13.08	18.40
14	.06408	4107	.0686	.073	.01243	4.931	4.413	3.982	80.44	396.6	355.0	320.3	.2028	.2266	.2511	.002521	.002817	.003122	9.42	11.26	15.92
15	.05707	3257	.0636	.066	.009858	3.101	2.776	2.504	101.4	314.5	281.5	254.0	.3225	.3603	.3993	.003179	.003552	.003936	7.84	9.37	13.26
16	.05082	2583	.0553	.060	.007818	1.950	1.746	1.375	127.9	249.4	223.3	201.5	.5128	.5729	.6349	.004009	.004479	.004964	6.37	7.62	10.78
17	.04526	2048	.0498	.054	.006200	1.226	1.098	.9906	161.3	197.8	177.1	159.8	.8153	.9109	1.010	.005055	.005648	.006259	5.50	6.58	9.30
18	.04030	1624	.0448	.049	.004917	.7713	.6904	.6230	203.4	156.9	140.4	126.7	1.296	1.448	1.605	.006374	.007122	.007892	4.10	4.90	6.93
19	.03589	1233	.0404	.045	.003899	.4851	.4342	.3918	256.5	124.4	111.4	100.5	2.061	2.303	2.552	.008038	.008980	.009952	3.70	4.40	6.23
20	.03196	1022	.0365	.041	.003092	.3051	.2731	.2464	323.4	98.66	88.31	79.68	3.278	3.662	4.058	.01014	.01132	.01285	3.10	3.71	5.25
21	.02846	810.1	.03296	.037	.002452	.1919	.1717	.1550	407.8	78.24	70.03	63.19	5.212	5.823	6.453	.01278	.01428	.01583	2.57	3.07	4.35
22	.02535	642.4	.02985	.034	.001945	.1207	.1080	.09746	514.2	62.05	55.54	50.11	8.287	9.259	10.26	.01612	.01801	.01996	2.22	2.66	3.76
23	.02257	509.5	.0271	.0315	.001542	.07589	.06793	.06129	648.4	49.21	44.04	39.74	13.18	14.72	16.32	.02032	.02271	.02516	1.81	2.17	3.07
24	.02010	404.0	.0246	.0291	.001223	.04773	.04272	.03855	817.6	39.02	34.93	31.52	20.95	23.41	25.94	.02563	.02863	.03173	1.66	1.96	2.77
25	.01790	320.4	.0224	.027	.0009699	.03002	.02687	.02424	1031	30.95	27.70	24.99	33.32	37.22	41.25	.03231	.03610	.04001	1.17	1.40	1.98
26	.01594	254.1	.02044	.0249	.0009692	.01888	.01690	.01525	1300	24.54	21.97	19.82	52.97	59.18	65.59	.04075	.04552	.05045	.995	1.19	1.70
27	.0142	201.5	.0187	.0232	.0006100	.01187	.01063	.009588	1639	19.46	17.42	15.72	84.23	94.11	104.3	.05138	.05740	.06362	.819	.979	1.38
28	.01264	159.8	.01714	.02164	.0004837	.007466	.006683	.006030	2067	15.43	13.82	12.47	133.9	149.6	165.8	.06479	.07239	.08022	.760	.909	1.29
29	.01126	126.7	.01576	.0202	.0003836	.004696	.004203	.003792	2607	12.24	10.96	9.886	213.0	237.9	263.7	.08170	.09128	.1012	.648	.770	1.09
30	.01003	100.5	.0145	.0190	.0003042	.002953	.002643	.002385	3287	9.707	8.688	7.840	338.6	378.3	419.3	.1030	.1151	.1276	.585	.690	.989
31	.00893	79.7	.01343	.01793	.0002411	.001857	.001663	.001500	4147	7.702	6.893	6.218	538.4	613.3	666.6	.1229	.14573	.1608	.410	.490	.693
32	.00795	63.2	.01245	.01696	.0001913	.001166	.001043	.000943	5179	6.102	5.464	4.930	857.63	908.68	1060.4	.1639	.18315	.2028	.351	.420	.593
33	.00708	50.1	.01158	.01608	.0001517	.000739	.000655	.000691	6591	4.844	4.323	3.911	1355.01	1526.71	1447.17	.2066	.2314	.2558	.293	.350	.495
34	.00630	39.7	.0108	.0153	.0001203	.000461	.000413	.000373	8312	3.840	3.427	3.100	2173.91	2421.30	2680.96	.2604	.2916	.3226	.257	.308	.435
35	.00561	31.5	.01011	.01461	.0000954	.000290	.000258	.000233	10461	3.046	2.725	2.459	3448.27	3875.96	3003.00	.3279	.3663	.4065	.240	.287	.406
36	.00500	25.0	.0095	.014	.0000756	.000183	.000163	.000147	13227	2.416	2.161	1.950	5464.48	6134.96	6802.72	.4132	.4630	.5128	.199	.238	.336
37	.00445	19.8	.00895	.01345	.0000599	.000114	.000102	.0000919	16694	1.915	1.714	1.546	8771.92	9803.92	10881.39	.5208	.5848	.6452	.158	.188	.267
38	.00397	15.7	.00847	.01297	.0000475	.0000721	.0000647	.0000583	21073	1.519	1.348	1.216	13869.62	15455.95	17112.66	.6579	.7407	.8197	.140	.168	.238
39	.00353	12.5	.00803	.01253	.0000377	.0000424	.0000407	.0000367	26525	1.205	1.078	.9727	22026.43	24570.02	27247.96	.8264	.9276	1.0278	.117	.140	.198
40	.00314	9.9	.00764	.01214	.0000299	.0000266	.0000256	.0000230	33444	.9556	.8552	.7715	35087.72	39062.50	43428.26	1.0460	1.1696	1.2953	.082	.098	.138

that combinations of these systems are common in practice, in which the final resistance will be expressed in ohms, as follows:

$$R = \left\{ \frac{1}{\frac{1}{r'} + \frac{1}{r''} + \frac{1}{r'''} + \frac{1}{r''''} + \ldots} \right\} + R' + R'' + R''' + R'''' \ldots$$

A rule for which might be set down as follows: "The final resistance in ohms of a mixed circuit will be equal to the reciprocal of the sum of the reciprocals of the several branch circuits in parallel, added to the sum of the several resistances in series."

When,

R = final resistance of the combined circuit, in ohms,

$r' + r'' + r''' + r'''' + \ldots$ will represent the respective resistances in ohms in parallel, and $R' + R'' + \ldots$ are resistances in series.

In order that the differences will be more clearly understood Fig. 7 is offered to show the manner in which the respective circuits relate to each other, in which A represents a circuit of a resistance R, in series with a battery B1, and a galvanometer G. B depicts resistances $r' + r'' + r''' + r'''' + r''''$ in series with a battery B1 and a galvanometer G. C indicates separate circuits, in parallel with the battery, which circuits are r', r'' and r'''. The galvanometer G is in series with the battery B1, and the resistance of the galvanometer, connections and battery are neglected. D indicates a condition in which the battery B1 and the galvanometer G are in series with resistances R' and R''. To these resistances are added the parallel resistances r', r'' and r'''. The function of the galvanometer is to enable the operator to observe when a current is set up in the circuit. The conventional methods here used for indicating a battery and galvanometer are in common practice and will be frequently employed in this work.

Formula of Joint Circuit

It is a common phrase that electricity follows the line of least resistance, yet the formula of the joint circuit shows that electricity permeates all the circuits, in parallel, rather than the path of least resistance; and this brings us up to a point where even insulation is a conductor, although of relatively low conductivity. The conductivity in mhos of a circuit is equal to the reciprocal of the resistance of the circuit. For illustration: If a circuit has a resistance of .5 ohms the conductivity of that circuit will be

$$C = \frac{1}{.5} = 2.$$

The word mho is the word ohm spelled backwards.

If the conductivity of a circuit is equal to the reciprocal of the resistance of the circuit, it must be true that the reciprocal of the conductivity of the circuit will equal the resistance of the same. In the case just assumed, the conductivity was found to be equal to 2; under the last named rule the resistance would be

$$R = \frac{1}{2} = .5.$$

It is sometimes convenient to take advantage of reciprocal values, and since the reciprocal of any number is equal to $\frac{1}{\text{number}}$, it is easy enough to reduce resistance to conductivity, and vice versa. We say $I = \frac{E}{R}$, in which the current in amperes is equal to the electromotive force in volts divided by the resistance in ohms. It would be just as easy to say I = E C, in which the current in amperes is equal to the electromotive force in volts multiplied by the conductivity in mhos. In every example then, it is a matter of choice to multiply by the reciprocal of the resistance, rather than divide by the resistance, and vice versa.

Poor Conductor of Electricity

Because the insulation, so called, is really but a poor conductor of electricity, it follows that the insulation resistance should be held as high as possible at all times. In low-voltage work, this is not a question of such great importance as it is in ignition service, in which the electromotive force may even approximate 50,000 volts. As an illustration of what it really means, taking an insulation resistance of 1 megohm—1,000,000 ohms—and a secondary impressed electromotive force of 30,000 volts, when the ground current will be that of a joint circuit in which the metallic circuit proper constitutes one of the legs. The loss to ground will be in proportion to the conductivity to ground relative to the conductivity of the metallic circuit, and if the metallic circuit measures—hot—30,000 ohms, a high value taken to illustrate the point, the relations will be as follows:

$\frac{1}{1{,}000{,}000} = 0.000{,}001$ conductivity through insulation in mhos.

$\frac{1}{30{,}000} = 0.000{,}033$ conductivity of metallic circuit in mhos

as, $0.000{,}033 : 0.000{,}001 :: 100 : x$.

$x = 3.03$ = relative loss through the insulation.

With a view to showing the extent to which high insulation is demanded in electrical work in general, reference will be had to the insurance rules on the subject. English insurance companies demand that the loss to ground shall not be more than $\frac{1}{20{,}000}$ of the whole current.

The Phœnix Fire Insurance rule is:

$$\text{Insulation} = \frac{12.5 \text{ megohms}}{\text{number of lamps}},$$

in which the lamps are rated at .5 amperes of current. It will be observed that there is a very intimate connection between Ohm's law and the functions of electrical circuits, and it has been the aim, in this work, to emphasize the importance of the law, by a process, taking into account the every-day problems involved.

(To be continued.)

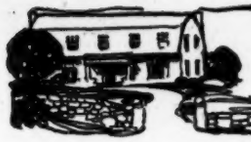
Manufacturers' Communications

AFTER THE WINTER IS OVER

Jeannette, Pa.—Editor Motor Age—It is best to remove tires from cars which have been stored during the winter in order to see what condition the tires are in. The tubes should be removed and thoroughly cleansed of talc with a damp cloth. The inside of the casing should be cleaned in a like manner. If this is not done, the talc may have hardened and will be very apt to cause a puncture of the inner tube. The inside of the rim should be thoroughly cleansed of rust by rubbing with emery-cloth, and afterwards giving a coating of shellac. If the inner tube is found to have lost considerably in elasticity, it is advisable to insert a new tube. Rubber deteriorates with age, and a tube which is over a year old is very apt to have hardened, and may go to pieces very soon after the car is taken out. If the cover of the casing is cut to any extent it is advisable to have these cuts vulcanized by a repair shop, which will prevent the entrance of dirt and water, tending to rot the canvas. Then, too, this is a good time to have such work done, as the casing is thoroughly dry and can better be vulcanized in that condition. In replacing casings and tubes on a car the tube should be lightly dusted with talc and replaced in the casing. Be sure that the security bolts are not badly worn, so that a sharp edge is exposed as in that condition they will be very apt to cut through the inner tube. —Pennsylvania Rubber Co.

BRANDING AIR PRESSURE

Akron, O.—Editor Motor Age—The practice of branding the required air pressure on all tires of 3½ inches and over is meeting with great favor. The recommended air pressures which are thus moulded into the tires are as follows: 3½-inch tires, 60 pounds; 4-inch tires, 75 pounds; 4½-inch tires, 85 pounds; 5-inch tires, 90 pounds; 5½-inch tires, 95 pounds. Insufficient inflation causes most of the troubles.—Firestone Tire and Rubber Co.



News from the Motor Clubs

Dearholt Made Treasurer—Lee A. Dearholt, chairman of the racing board of the Milwaukee Automobile Club, has been elected treasurer of the club to fill the vacanacy caused by the resignation of James T. Drought, who was both secretary and treasurer. Arthur C. Brenckle is the new secretary.

More Councils Organized—Two more councils of the State Association of Motorists, the organization which is being formed throughout Maryland to demand proper legislation for motor car owners, were organized during the week by Secretary Frank Darling, of the Automobile Club of Maryland, the official organizer. These councils are in Salisbury, Wicomico county, and Elkton, Cecil county, the home of Governor Crothers, whose commission has been urging the bill which has caused so much opposition on the part of the motorists, particularly in regard to the special taxation of cars.

Boston on the Job—The Bostor Motor Club is now in working order, as the directors have appointed the various committees and everything is going along admirably. The house committee comprises A. B. Henley, J. A. Dowling and P. P. Pretto. E. A. Gilmore has been made chairman of the touring and contest committee with power to appoint two additional members to serve with him. A. P. Teele, A. B. Henley and A. D. Peck comprise the publicity committee. The committee on quarters, A. P. Teele, A. B. Henley and R. R. Ross, has been visiting some of the hotels seeking a permanent location for the club. At the next meeting it is expected that the problem of permanent quarters will be settled and the contest committee will make a report relative to doing something in the way of sport.

Gophers Accomplish Much—At the annual meeting of the Minnesota State Automobile Association held recently enthusiastic reports were made from representatives of the nineteen clubs in the association. The majority of the clubs are devoting their energies to good roads work and sign-posting. One feature which was noticeably present in the majority of the reports, was the attention paid by nearly all of the clubs to securing the coöperation, successfully, of the farmers. In many instances the clubs have purchased split log drags with which the farmers work out their road taxes. Drags are being kept in operation in many of the counties at the club's expense in that county and in this way great strides are being taken in accomplishing visible results in the good roads work. Officers elected for the coming year were Colonel F. M. Joyce, president, and Dr. W. H. Card, secretary-treasurer, both of whom succeed themselves.

Judge Gary Reëlected—Judge E. H. Gary was reëlected president of the Automobile Club of America at its annual election. His election was without opposition, and the others nominated were also returned to office, unopposed, as follows: First vice-president, Henry Sanderson; second vice-president, William G. McAdoo; treasurer, Alfred Ely. Horace Porter, George F. Chamberlin and John Jacob Astor were elected to the board of governors, to serve for 3 years.

Down Town Club Wanted—Ever since the Detroit show a movement has been in progress in Detroit for the formation of a down-town club. The members of the trade, only a few of whom are affiliated with the Automobile Club of Detroit, are foremost in the movement, formal details of which will be announced shortly. The new club will fill another long-felt want as well, in providing a congenial gathering place for the motorists in the winter, while the Pine Lake home of the Detroit Automobile Club is closed.

Syracuse Club Active—On May 1 the Syracuse Automobile Club will open permanent offices at room 606 in the S. A. and K. building, where a clerk will be permanently located to impart information and assistance to all visiting tourists. The club has started on a vigorous signboard campaign and there are now 100 caution, route and road signs in the office of Secretary Forman Wilkinson awaiting an opportunity to be posted in the villages of the neighboring counties. The club will issue a monthly bulletin in which its activities and programs will be published and the work being accomplished outlined to the members.

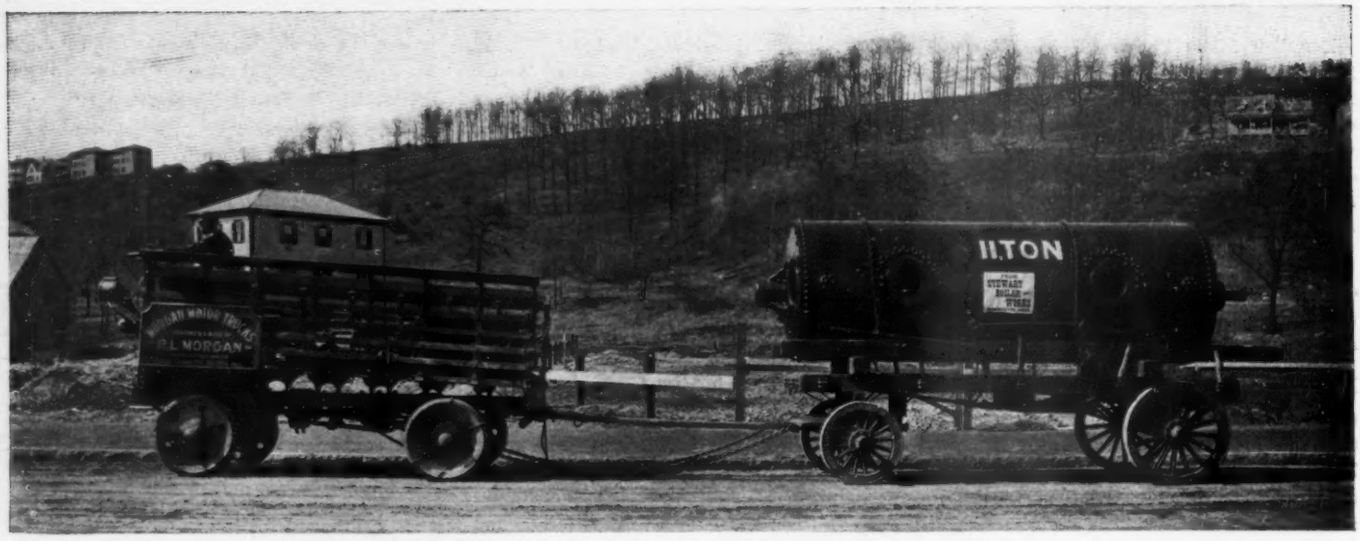
Minneapolis Committees—Chairmen of committees of the Minneapolis Automobile Club reported their appointments to the board of trustees Tuesday night at a regular meeting of the board. The committees are as follows: Good roads—G. A. Will, chairman; T. N. Kenyon, Asa Paine, L. S. Gillette, E. G. Walton; tours and contests—Dr. C. E. Dutton, chairman; J. B. Hammond, Louis Koch, John S. Johnson, R. E. Tucker, Harold Vorce, N. S. Gotshall; sign posting—Harold Vorce, chairman; William E. Roby, A. E. Kelly, J. L. Tracy, B. E. Stimson; laws and ordinances—Dr. C. H. Kohler, chairman; G. A. Will, Swan J. Turnblad, F. L. Schoonmaker, E. J. Phelps. F. M. Joyce was appointed chairman of a special committee to be appointed by him later, to arrange for the entertainment of the Glidden tour, which is due to arrive in Minneapolis in July for a Sunday stop. There will be at least twenty-five members on this committee.

Plans a Clubhouse—The Milwaukee Automobile Club has authorized its board of directors to proceed with the acquisition of a tract of land outside of the city limits and arrange for plans for a clubhouse. The board doubtless will choose a site on the Blue Mound road. Enough land will be purchased to care for future needs, as many members are in favor of laying out golf links and an athletic field, with a concrete saucer track 1 mile or ½ mile. The track scheme is yet too vague to be definitely stated, but it is said that the plans of the board have this in view. The clubhouse will cost $12,000 and is expected to be one of the most beautiful country clubs in the west, besides having all conveniences and modern improvements.

Detroit's New Board—At the annual meeting of the Automobile Club of Detroit the following officers were elected: President, Christian H. Hecker; vice presidents, Arthur Pack, Walter Brooks, Dr. E. A. Christian; secretary, Frank H. Weldon; treasurer, Thomas J. Antekell; directors, Christian H. Hecker, George S. Hodges, Arthur Pack, Albert F. Pack, Walter Brooks, Dr. E. A. Christian, Thomas J. Antekell, Frank H. Weldon, E. S. George. Under Mr. Hecker's presidency the club is planning increased activity. A considerable improvement and enlargement of the club house and further good roads work along the line of the main highway between Detroit and Pine Lake, where that structure is situated, are planned. The formal opening of the club house will take place on or about May 1, no definite date having been set.

New Officers All Owners—The annual meeting of the Automobile Club of Hartford, of Hartford, Conn., was held last week. General Wallace T. Fenn was elected president, Thomas W. Russell, vice president; C. D. Alton, Jr., was re-elected treasurer, and Arthur Guy Hinckley, secretary. The officers are all motor car owners and not allied with the trade or industry in any professional capacity. The nominating committee also suggested that the standing committee chairmen be elected as follows, they heretofore having been appointed by the chair at the annual election: Good roads and sign board committee, C. D. Rice; membership committee, Edgar L. Ropkins; contest committee, H. P. Maxim; house and entertainment committee, N. F. Allen; rights and privileges, Colonel George Pope. The club outlook is promising.

The Realm of the Commercial Car



MORGAN 5-TON TRUCK HAULING A LOAD OF 18½ TONS AT WORCESTER, MASS.

UNUSUAL FEAT OF TRUCK

A FEAT out of the ordinary was performed recently at Worcester, Mass., by a Morgan 5-ton truck, which hauled a load of 18½ tons, exclusive of its own weight. Charles M. Stewart, a boiler manufacturer, asked Ralph L. Morgan if the Morgan truck could take an 11-ton boiler to the rendering works in Auburn, Mass., from his factory in East Worcester. Mr. Morgan replied it would be an impossibility to carry it down, but that his truck would haul it. Thereupon a wager was made and Mr. Morgan reported with a caravan which weighed 3 tons itself. The weight of the tank with its mass of stirring apparatus within was 22,006 pounds. The motor truck contained a load of 9,000 pounds placed there to give it proper traction. Adding these together with the 3 tons weight of the caravan makes a total of 18½ tons, which does not include the 5-ton weight of the truck itself. Road conditions were bad following a rain, but without a hitch the big truck started the load and hauled it to the town of Auburn at a speed of 3 miles an hour on low gear. The truck was not specially prepared for the feat, for it is the only one built by Mr. Morgan. It is the one that did 947 miles in 1 month and accomplished 146 miles in 13 hours as 1 day's work. It hauled 333,226 pounds in 5 days for the American Steel and Wire Co., and went up the snowy Elm street and came down icy Walnut hill last winter when horse teams were marooned.

RAMBLERS IN FIRE SERVICE

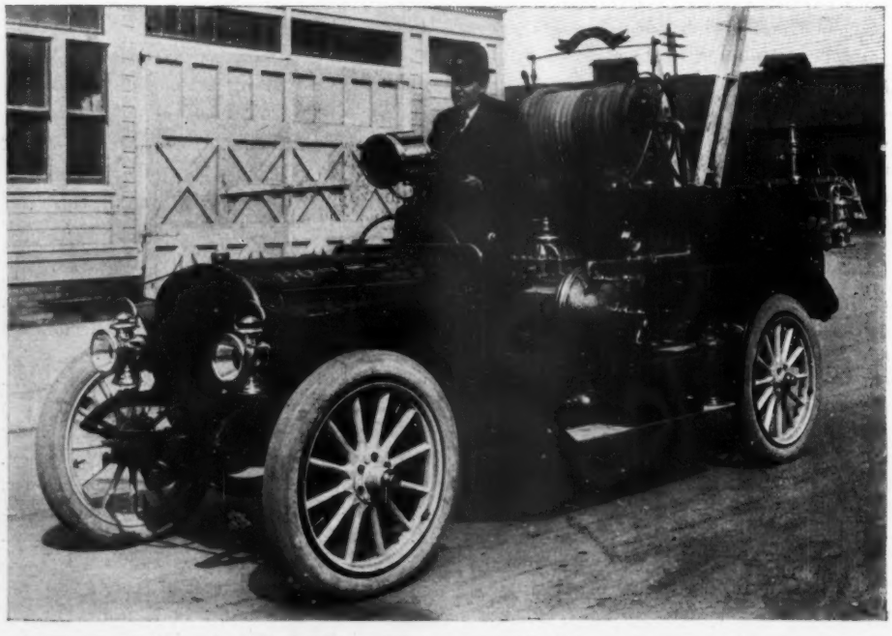
Although Thomas B. Jeffery & Co., makers of the Rambler, are not yet building cars for commercial purposes, there are now in use in southern California several motor car fire engines and general utility trucks constructed upon Rambler chassis. A new chemical truck has just been put into commission by the city authorities of Pomona, Cal. This was built on a model Forty-five Rambler chassis, has a 45-horsepower engine and 124-inch wheelbase. The chemical apparatus and hose-carrying mechanism were fitted to the car in California. Recently this apparatus reached a fire 2 minutes after the alarm was received, while the apparatus previously used was drawn by volunteer firemen. Another Rambler chassis will be used in the construction of a similar apparatus by the city of San Diego, Cal.

HAULS GRAVESTONES

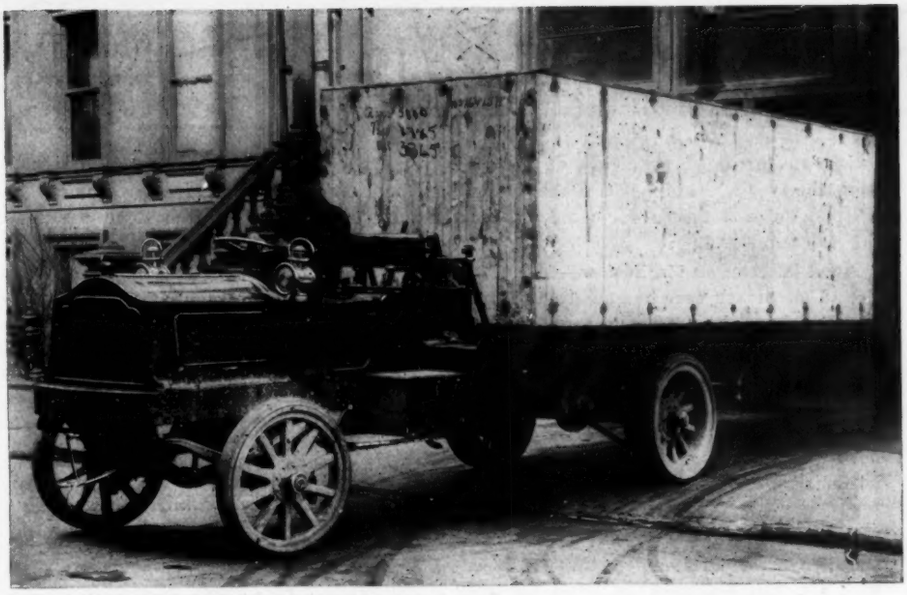
Archie Brothers, builders of monuments and gravestones at Watertown, Wis., with branches at Waterloo and other cities in that territory, have purchased a model R Mitchell touring car, with special body, for use in the business. The company now has in service a four-cylinder Rambler, purchased in 1908, which will care for the Waterloo branch.

MOTOR TRAIN IN WEST

A unique motor train consisting of an engine and three trailers is now on its way under its own power from San Diego, Cal., to Death Valley, where it will be used in hauling soda from the mine in the deserts near Johannesburg to the nearest railroad station, 26 miles away. The combined power of the engine and three trailers is 150 horsepower. The train is con-



NEW CHEMICAL TRUCK ON RAMBLER CHASSIS AT POMONA, CAL.



PACKARD CAR CRATED FOR TRANSATLANTIC SHIPMENT

nected by a shaft from the engine to the first car, back to and underneath one of the trailers. A clutch connects each section of the shaft. By means of this clutch the engine propels not only the head car, but gives impetus to each trailer.

HAULS BIG CRATES

The motor truck is becoming popular as a convenience in hauling heavy, bulky shipments in New York city. In the crate —shown in the accompanying photograph —which measures 15 feet 3 inches by 6 feet 4 inches by 5 feet 7 inches, is a Packard Thirty touring car on its way to the hold of a transatlantic liner, its owner being bound for a tour through Europe. The gross weight of the crate is 5,110 pounds, the tare being 1,745 pounds, and the net weight of the crated car, 3,365 pounds. The truck also is a Packard.

NEW TAXICAB COMPANY

For several months there has been quietly perfected an organization for the installation of a new taxicab service in New York. This organization has developed out of the efforts of C. F. Wyckoff and E. S. Partridge, of the firm of Wyckoff, Church & Partridge, assisted by A. R. Rockwell, F. E. Moscovics and De Witt Page, of the Bristol Engineering Co., of Bridgeport, Conn. The name of the new company is the W. C. P. Taxicab Co. The company aims first to do everything in its power to remedy existing evils, and to show the taxicab people that it is possible to operate cabs in the interests of those who pay for good service. The company has taken steps to supply the public with blank forms and return post cards inviting criticisms and comments. This is not done for mere advertising purposes, but is prompted by a desire to meet the wishes of its patrons. The meters on W. C. P. cabs will be operated from the front wheels of the chassis. The chassis, wheels and lower portion of the body are a medium chrome, orange yellow thinly striped with black. The engine hood and upper portion of the cab are black. The chauffeur's uniform is in keeping and harmony with the cab. The long double breasted top coat is blue gray, with black collar and cuff bands, edged with orange yellow. The cap is black, with orange cord and embroidered orange crescent trade mark. The chauffeur's seat is located at the left side of the cab, and the change speed levers are in the center. This location of driver's seat makes it easy to put baggage on the front of the cab at his side, as this can be done directly from the sidewalk instead of carrying it around into the street, as is the usual way. Space has been reserved at the garage of Wyckoff, Church & Partridge at 232 West Fifty-sixth street, near Broadway, from which location the yellow taxis will be operated. Negotiations are now pending for substations as soon as a sufficient number of cabs are in service to require their use. Seventy-five will be on the streets by the first of June and 200 by the first of September.

WASHINGTON TAXI RATES

A public hearing before the district commissioners was held last Friday in Washington, D. C., relative to the schedule of taxicab rates drafted by the commissioners under authority given them by a recent act of congress. H. Cornell Wilson, of the Terminal Taxicab Co., and A. L. Cline, of the Federal Taxicab Co., were present and made strenuous objection to the new scale, arguing that the rates in other cities, which formed the basis of the rates about to be put into effect here, have been declared too cheap.

The commissioners' rates which will in all probability be adopted, are as follows: For the first ½ mile or fraction thereof, 30 cents; each ¼ mile thereafter, 10 cents; each 6 minutes of waiting, 10 cents. This tariff applies to both day and night, one, two, three or four persons, same price. For carrying one trunk and traveling bag or suit case, 30 cents; for each additional traveling bag or suit case, 10 cents. Cabs going to or from the union station, or from any garage to any point within a radius of 2 miles of such station or garage, shall charge for the distance covered in transit to such point when carrying a passenger or passengers, but shall not impose additional charge for distance covered when traveling empty. Distances beyond the 2-mile limit shall be charged for at the rate of 5 cents for each ¼-mile going and returning, for such distance as lies beyond the radius. Taxicab service from any point within 3 miles of any garage to any theater and return shall be not more than $3 for one or two persons, nor more than $4 for three, four or five persons.

RAMBLER CONVERTED INTO NOVEL REPAIR WAGON

Ex-Governor Converted—A. A. Tuttle ex-governor of New Hampshire, is to become an active motorist next summer. He has just ordered a car.

Prizes for Racers—The Bosch Magneto Co. announces that it will offer cash prizes in the French voiturette races to drivers whose cars are equipped with Bosch magnetos—$600 for a victory, $200 for second and $100 for third.

Wisconsin Licenses—Five hundred and fifteen licenses were issued by the secretary of state of Wisconsin in the period from January 1, 1909, to April 15, 1909, an increase of nearly 100 per cent over the same period in 1908. Last year 290 licenses were issued. The total number of licenses now issued has nearly reached the 7,000 mark.

Dust-Proof Track—A track absolutely free from dust is promised at the Indianapolis motor speedway, now under construction. The wearing surface of the track will be gravel and asphalt rolled together. The track will be sprinkled with 220,000 gallons of asphaltum oil, and this will be renewed as necessary, so that spectators can witness the cars perform when at any portion of the track.

Salary Instead of Commission—The drivers in the service of the Boston Taxi-Service Co. are now placed on salary. Formerly they were given a commission of 20 per cent and they had to pay for their own gasoline. Manager A. E. Morrison had received complaints that the drivers went too fast, and he believed that this frightened women and children who patronized the cabs. As the commission system led to hustling to get back for other jobs, being really a gamble for the driver, Mr. Morrison decided the best interests of the company were not being served. Since the men have been on a salary basis the receipts have increased and there are no longer any complaints.

New Motoring Mecca—A new shrine for such motorists as have the proper sentiment and are interested in historical spots will be open this summer. This will be Spiegel Grove, a tract of 11 acres in the city of Fremont, O., which is to be transformed into a state park to be known as the Harrison Trail state park. The remains of the former president, Rutherford B. Hayes and his wife, Lucy Webb Hayes, will be removed to a knoll in this park, which is in the future to be maintained by the Ohio Archaeological Society at the expense of the state. Although its natural beauties are great, the park will be improved. The ground was presented to the archaeological society by Colonel Webb Hayes a short time ago. As the city of Fremont is easily accessible by motor car, owing to the good condition of the surrounding roads, this park probably will become quite a mecca for motorists during the summer.

Aged Woman an Enthusiast—Mrs. F. D. Cottle celebrated here one hundredth birthday on March 12, 1909, and took a ride in a motor car the same day. When 98 years of age she rode from New York to Boston in a touring car. She now has been nominated for queen of the New York carnival next week, but she will ride in the parade without regard to the results.

Oiled Road to Speedway—In order to provide a suitable driveway to the new speedway, the Indianapolis Motor Speedway Co. has proposed to build an oiled boulevard at its own expense from the Emrichsville bridge across White river to the new speedway near Indianapolis. The only conditions imposed are that residents along the proposed boulevard shall plant trees in front of their property and keep their fences in good repair.

Thief Sentenced—Motor car thieves received an effective warning in Buffalo when Justice Wheeler recently sent George C. Bierne to Auburn prison for not less than 1 year and 3 months nor more than 3 years for stealing the motor car of Dr. L. G. Hanley, of Buffalo, Bierne pleaded guilty. He tried to sell the machine after driving it to Pembroke, N. Y. District Attorney Dudley, of Buffalo, says motor car thieves will be dealt with severely.

Spanish Road Race—The Copa Catalunya will be contested in Spain May 20. This event is a road race for voiturettes, promoted for the first time last year by the Automobile Club of Barcelona. This year the race will be held over a total distance of 380 kilometers. It is open to monocylinder cars with 100 millimeter maximum bore and 500 kilos maximum weight, empty; two-cylinder cars with a maximum bore of 80 millimeters and weighing not more than 600 kilos, empty; four-cylinder cars with a maximum bore of 65 millimeters and weighing not more than 650 kilos, empty.

Another Car for Taft—A second Pierce-Arrow car for the use of President Taft and family was shipped during last week from the factory at Buffalo to Washington. The new car is a six-cylinder, 36-horsepower landaulet and, like the first car of the same make, was bought with money appropriated for the purpose by congress. The first car for the president was a six-cylinder, 48-horsepower suburban. An extra touring body has been ordered for it. Both cars are painted dark blue with a russet stripe following the lines of the molding. The suburban car is upholstered in blue broadcloth while the landaulet is trimmed in gray whipcord. The coat of arms of the government has been emblazoned on the door panels of each.

Will Export Cars—Consul-General Richard Guenther quotes a statement in the German press that a company has been formed at Mannheim, with a capital of several million dollars, for the purpose of exporting a certain make of motor car to the United States.

Can Insure Iowa Cars—The Iowa general assembly just before its spring adjournment passed a bill which provides that insurance companies of the state may accept motor car risks. The measure had the support of owners who have realized the need of such a law for a year or more.

Buys a Hoosier Car—After investigating the merits of a number of different motor cars, the Indianapolis board of school commissioners has purchased a Marmon touring car. Several bids were submitted, but an Indianapolis-made car was given the preference. The car will be used by J. E. Cleland, the business director of schools, and members of the board, for visiting school buildings.

President Taft Will Be There—The Automobile Club of Washington has been invited to participate in the parade that will be the crowning event of home-coming week in Alexandria, Va., on April 30. President Taft has been invited to grace the occasion and has accepted. It is understood he will make the trip to the Virginia city in his White steamer. The club is now making arrangements for the parade and it is expected that a hundred or more decorated machines will be in line.

Tour for Tradesmen—The Indianapolis Automobile Trade Association has under consideration the question of an annual tour for members and their friends and the project will probably be adopted. In such a tour, it would be for pleasure only and no effort would be made to develop speed or show the endurance of the cars. Trips of from 3 to 6 days have been suggested. The association is composed of practically all tradesmen in the city, including both manufacturers and dealers.

Electrics in Run—Besides the Woods electric runabout, which will be a contestant in the road ability run of the Quaker City Motor Club to Atlantic City on Saturday, there is another one of the type entered. It is the light delivery wagon entered by the Commercial Truck Co. of America. It uses shaft drive and gears are completely enclosed and run in oil. Its steering and gear controller forms a combined unit. The controller is mounted around the steering part and is operated by a hand wheel placed directly under

the steering wheel. There are already forty-two entries for the run, which is over a 68.2-mile route, and as Secretary Harbach has a large number of contingent entries there are sure to be close to threescore starters from the Hotel Walton quarters of the club Saturday at 1 p. m.

Helps a Railroad—Motor cars played an important part in forming an adjunct to a railway line April 10 when a score of them were brought into service to transfer passengers from the wrecked Rock Island train near Kechi, Kan. Before the railroad could establish its service motor cars had whisked the passengers to Wichita, a distance of 9 miles, where other connections were made.

After His Road Rights—The tables were turned at Junction City, Kan., when a suit for damages was filed by the owner of a motor car against the owner of a team of mules for damage sustained by the car as the result of having to turn out of the road to allow the team to pass. This is believed to be the first instance where a motor car driver has sued for damages because his road rights were not respected.

Garrett Resigns—Mayor John A. Garrett, of Glen Echo, Montgomery county, Md., who became prominent in the public eye several years ago because of the warfare he and Town Marshal Charles P. Collins waged against persons who ran their motor cars in excess of the speed limit fixed by a town ordinance, has resigned. Diplomats and other persons of high degree were arrested by the marshal and taken before Mayor Garrett, who imposed fines without regard to persons.

Chief Gets His Car—The Buffalo councilmen have voted in favor of a motor car for Chief of Police Regan of that city. Superintendent Regan appeared in person to urge that such a machine be provided, saying that it would be invaluable in cases of emergency. Councilman Burt did not like the idea of buying a touring car. He thought a motor patrol wagon would be better, but Superintendent Regan finally convinced the board otherwise and the item was passed.

Wilkes-Barre Card—The contest committee of the Wilkes-Barre Automobile Club has decided upon the following list of events for its annual hill-climb on Grant's Despair, May 31 next: Gasoline stock cars, $850 or less; gasoline stock cars, $851 to $1,250; gasoline stock cars, $1,251 to $2,000; gasoline stock cars, $2,001 to $3,000; gasoline stock cars, $3,001 to $4,000; four-cylinder gasoline stock cars, $4,000 or over; six-cylinder gasoline stock cars, $3,000 or over; free-for-all, any type or motive power; gasoline stock chassis, with piston displacement of 45 cubic inches and not to exceed 600 cubic inches, and weighing not less than 2,400 pounds; gasoline stock chassis, with piston displacement of 301 cubic inches and not to exceed 450 cubic inches, and weighing not less than 2,100 pounds; open only to cars owned by members of Quaker City Motor Club; open only to cars owned by members of the Wilkes-Barre Automobile Club. The Philadelphia contingent, as usual, will be a large one, the Q. C. M. C., as in former years, having decided to call a 3-day club run to the Diamond city.

Permitted in Cemeteries—The last number of the Cincinnati Honk-Honk, the official organ of the Cincinnati Automobile Club, contains statistics compiled by the club as to the number of cemeteries in the country in which motor cars are permitted to enter. Of seventy-four heard from all but twelve permit the entrance of cars. Six of the Philadelphia cemeteries, five in Detroit and four in Baltimore allow this. The report shows whether or not there are any restrictions and the days they are open.

Tire Records at Shows—There were twenty-one shows of prominence held during the last season, covering the full winter. At these shows many thousands of cars were shown, and the tire makers took the greatest interest in securing data showing equipment of these cars in the matter of tires. The record of the season as compiled by the B. F. Goodrich Co., of Akron, O., claims that in the equipment of tires, the makers used 2,871 Goodrich tires, and that the record of the next nearest competitor was 2,616.

Boulevards for Oklahoma—Fourteen townships surrounding Oklahoma City will soon be put in close communication with that city as the result of a good roads movement started to build boulevards for a distance of 3 miles in each direction. These boulevards when completed will form the neucleus around which will be built other numerous highways throughout the state that in time will form a net work of good roads that will hardly be excelled by any southern state.

Money For a Boulevard—An appropriation of $5,000 has been made by the legislature for the construction of a boulevard from Denver to Golden. Public-spirited citizens have offered additional funds for this purpose, and there will soon be a fine drive between the two cities. The new road will become a favorite run for tourists who wish to drive to the foothills from Denver. The Rocky Mountain Highway Association and the Denver Motor Club have been largely instrumental in securing this improvement.

Unusual Accident—A motor car figured in a curious accident at Boston last week. The machine is owned by Dr. H. A. Lothrop, and he left it standing outside the Carney hospital, which is located at the top of a steep hill. There was a terrific gale blowing and one gust caught the car with such force that it swerved it out on the street and down the hill it started, gaining momentum at every yard traversed. It narrowly missed hitting an electric car and bowled across the street, plunging head on into a shoe store. The occupant of the store saw it coming and rushed back out of danger. There was a terrific crash as the car hit the glass windows. No one was injured but the motor car was badly damaged. This should be a warning to set brakes.

Talks Good Roads—Highway Commissioner Sargent, of Maine, is planning a busy season this year in repairing and constructing the highways, and he is meeting local commissioners to get coöperation in the work. He visited Bath a few nights ago and delivered an address to the selectmen and road commissioners of Sagadahoc county upon good road building. He spoke upon the sections to be selected for improvement, drainage, outlet, foundation and surfacing and the materials to be used. At the conclusion of the address the meeting was open to general discussion of the work.

Improving Colorado Roads—Nearly a million and a quarter dollars will be expended this year on improving Colorado roads under the provisions of a bill passed by the seventeenth general assembly of the state. A road commission has also been appointed and as soon as conditions warrant active work will begin. The commissioners, three in number, will work separately, each commissioner being assigned a district, and will work in conjunction with the several counties. Ninety per cent of the $80,000 the state receives annually from the government forestry taxation will also be made available by the provisions of the bill.

Laboratory Find—The engineering laboratory of the University of Wisconsin, Madison, Wis., is experimenting with a waste product of paper mills, an oil called spruce turpentine, which is believed to be the best agent yet found for denaturing alcohol as a fuel for internal combustion engines. Tests have shown that 85 per cent of oil is not turpentine at all, but cymol, a substance closely resembling the benzol used in Germany with alcohol to overcome the disadvantages of the thermal differences between alcohol and oil as a fuel. Wisconsin is one of the greatest of paper-producing states and there is no lack of a supply for the waste product.

Calls It Livery Stable—The refusal of the Milwaukee building inspector, E. V. Koch, to grant a permit to William F. Johnson to build a garage on Downer avenue, between Bradford and Stowell avenues, in the elite part of Milwaukee, has aroused a storm of protest. The inspector has added insult to injury by classifying garages as livery stables in his refusal of a permit. Mr. Johnson planned to build a handson one-story garage of concrete, with cut stone embellishments, not at all out of harmony with the pretty surroundings and rather better than many homes in the vicinity. This is the first time that this class of permits has been refused a builder, and it is expected that Mr. Johnson will take the matter into the courts.

ELIMINATION OF NOISE IN A MOTOR CAR

By Coker F. Clarkson

NOISE from gears is one of the most important things to consider in the making of a quiet-running motor car. A transmission can now be made of hard alloy steel with practically noiseless spur gears so far as vibration is concerned. Experience in electric machines long ago indicated that an unhardened gear of the herring-bone type could be made positively noiseless. Of course, a sliding herring-bone gear cannot be made.

One theory of noise in gears is that of irregular tooth pressure; when, from slight inaccuracy, one tooth has a pressure different from that of the next succeeding tooth, thereby setting up a varying vibration and backlash. If the speed of the gears is rapid, a complicated vibration, amounting to a noise, is set up. The shape of the transmission—change speed gear—case has a material effect on its quiet running qualities.

Method of Cutting Gears

In one method of cutting gears, the teeth are planed, not cutting too much; making every effort to get the gears accurate. In another method, the cutting is done by a rotary cutter, accuracy being obtained by making a large diagram of the shape of the cutter, making it sometimes ten times the normal size, and then forming the cutter accurately to suit the number of teeth and pitch in each particular gear. This makes a more difficult job to get an accurately generated tooth-shape with great accuracy between each tooth, than with the planing process above mentioned. It is difficult to overcome the distortion of a gear in hardening.

In the case of camshaft gears there is an action different from that of any of the other gears in the car; an intermittent action. There is a diversity of opinion as to the proper size, width of face, pitch and material of camshaft gears, to best solve the problem of this particular condition.

Bevel gears, it is pretty generally conceded, run more quietly than spur gears. One reason given is that they have a chance to spring away from the tooth pressure, whereas the spur gear have not unless their shafts and bearings also spring away.

There does not seem to be any material difference in the quiet-running qualities of a car, whether it has a dust pan under it or not, or whether the underpan is made of sheet-iron or aluminum. Of course, it is assumed that the pans, in either case, are properly attached, so that they will not rattle.

Quiet-Running Qualities

American-built cars of remarkably quiet-running qualities were very early conspicuous by comparison with foreign machines. Interesting instances are related of Europeans taking apart American-made motoring cars while in Europe, to ascertain the cause of their relative noiselessness. The members of the Association of Licensed Automobile Manufacturers have for several years devoted much study to, and made many experiments in, the details of design and construction making for a reduction of noise in normal running to a minimum. The true motorist likes to listen to the contented purr of his engine, but nevertheless the present-day motor car must be, generally speaking, very quiet-running.

A high-grade gear, which may reasonably be expected to stand up to its work for tens of thousands of miles, must be properly designed, of the proper material, subjected to repeated approved heat and mechanical treatments, and be accurate not only as to tooth-form, but have a hole of true and proper size, its keyways, or corresponding members, of proper dimensions and accurately located; its blank having been turned true and of exactly proper diameter. To obtain quiet-running, the form of the tooth must be laid out properly, selecting from the different forms advocated by various engineers; every step in its manufacture and mounting made carefully and with precision.

Large vs. Small Gear Wheels

There is a difference of opinion as to whether relatively large or small gear teeth run more quietly; that is, teeth of large or small pitch. One argument in favor of the fine teeth as against the coarse, is that they have a greater number of teeth, or points of contact, in mesh at one time, which distributes the load and prevents chatter.

Noise is due primarily to inaccuracy of tooth-form, but can also be caused by putting a pair of gears in mesh too closely. With a hunting tooth arrangement, that is, with an odd tooth in one gear—the number of teeth in one gear not being a multiple of the number of teeth in its mate—the gears may wear to a state of comparative noiselessness after a while. However, good gears will not show material wear in a reasonable length of time. Running in emery and oil for a time in assembly or test, will reduce noisiness somewhat; but unless the teeth are properly and accurately formed in the first instance, this will seldom obviate the trouble entirely. Assuming that the gears are set with a proper amount of clearance between them, running in emery will help very little.

Experiments Are Necessary

To determine whether a web gear, as distinguished from a spoked one, will in a certain position cause noise is a question largely of experiment. All possible chances of side strains should be considered and provided for. If there is any chance of the shaft, carrying the gears, being thrown out of alignment, there would be a slight throw of the web, which would cause noise, as it would be in the nature of a vibration.

In regard to material, the metals that run most quietly together are bronze and steel. Of course, fiber, fibroid, rawhide and composite materials give very good results where the load is not heavy.

Machining gear teeth, so as to make them perfectly noiseless, is expensive, but it is possible. They may be surprisingly loose and yet quiet. Any gears that have the correct form of tooth will run together quietly, loose or tight, providing they are not too tight, say with a backlash of one or two-thousandths of an inch. The points of a spur gear have a theoretical tendency to interfere. If this were not so, the spur gear would be practically as quiet as the herring-bone type of gear. It is impossible to illustrate exactly the action of the herring-bone gear, but, in an exaggerated way, it is analogous to the action of a worm meshing with a worm wheel.

Question of Accuracy

The question of noise in gears comes down to a question of accuracy, not only in cutting and finishing, but in mounting them in their respective places. The shafts on which they are to run must be parallel and be in the same plane.

Five to seven-thousandths of an inch clearance is about the correct amount for spur gears. With fixed shafts, a greater amount would be of no advantage. In motor work it is unnecessary to make the gears run without any backlash, except in the case of valve gears, by which the valve and ignition apparatus must be actuated exactly in time. In some cases the clearance of various gears on a motor car is as much as ten or twelve-thousandths of an inch. It is in matters like this, which, as a matter of fact, is one of the most complex subjects in motor engineering, that long experience in motor car manufacture gives the pioneer American makers a marked advantage in their endeavor and repeated success in producing machines, judged on any basis, at least the equal of any made at home or abroad.

Iowan Builds Motor Plow

F. W. Priestly, of Webster City, Ia., has just completed the construction of a motor car which will be used on a farm to drag two gang plows in the field. The motor plow is equipped with an air-cooled gasoline engine of 25 horsepower. The diameter of the wheels is 4 feet, the rear wheels are 20 inches wide, while the front ones are 10, all shod with steel. It is expected this machine will do the work of five men and fifteen horses. It weighs 5,000 pounds and will make fair speed on the roads. It is believed that the motor plow will soon revolutionize Iowa farming.

Brief Business Announcements

Hartford, Wis.—James Favour will open a garage and repair shop on Second street.

Los Angeles, Cal.—The Thomas Motor Car Co. is now located in its new garage on Olive street.

Middleton, Conn.—The Frisbie Motor Co., of this city, has been authorized to change its name to the Frisbie-Heft Motor Co.

Pittsburg, Pa.—H. S. Anderson has opened a large repair shop at 6225 Penn avenue, E. E., where the Union Auto Repair Co. formerly held forth.

Atlantic, Ia.—J. S. Hedges is building an addition to the garage of the Atlantic Automobile Co. It will be a 50 by 50 foot structure of modern construction.

Milwaukee, Wis.—The Milwaukee Auto Tire Repair Co., 457 Milwaukee street, has taken the state agency for the Nadall demountable rim. The company also handles the Republic tires.

Mason City, Ia.—Contracts have been let for the erection of a modern garage on Fifth street to be occupied by the agencies of the Maxwell and Reo cars. When completed it will be one of the largest garages in this section of the state, occupying half a business block.

Oklahoma City, Okla.—A company composed of Joseph Huckins, Jr., H. R. Connor and C. R. Riggs has been organized with a capital stock of $10,000 to operate a taxicab service here. There are already two taxicab companies in Fort Worth and three in Dallas, all of which are doing a profitable business.

Waukesha, Wis.—The Ladewig & Stock Co., manufacturer of brewers' supplies and brass goods, has established a factory for the manufacture of motor car accessories and parts. The Madison street factory will be devoted entirely to this feature of the business, and a new factory is to be erected on Laflin street for the other divisions.

Washington, Ill.—The Washington Automobile Co. has just recently been organized for the purpose of handling motor cars in a jobbing way, covering the entire state of Illinois and also a portion of Iowa and Indiana. The organizers of this company are Charles F. Clements, of Peoria, Ill.; F. B. Hungerford and George Rinkenberger, of Washington.

Omaha, Neb.—Announcement is made of the reincorporation of the business of the Central Tire and Rubber Co. The interest of Herbert K. Wheelock, who has acted in the capacity of manager for several years, was purchased by Harold L. Kuhn and Walter C. Mann. As it now stands the company is composed of Ole Hibner, president; Harold L. Kuhn, vice-president; Frank C. Johnson, secretary, and Walter C. Mann.

Omaha, Neb.—The Berger's Automobile Co. has taken the agency in Omaha for the E-M-F.

Lincoln, Neb.—The Miluka & Houfek Automobile Co. has taken the agency for the Hupmobile.

Delavan, Wis.—Calkins & Dinsmore, proprietors of the City garage, have added a repair department under the management of R. Lindner and Fred Linke.

Des Moines, Ia.—The Mason Motor Car Co. has moved into its new quarters on East Fifth and Vine streets. The new building is two stories in height and is 60 by 125.

Beaver Dam, Wis.—The Silo Garage Co. has been organized to build a garage and do a general agency and livery business. A building is to be erected on West Front street, 50 by 50 feet in dimensions, to accommodate twenty cars. The company will carry a complete line of supplies and accessories and will have a repair department. The line of cars has not yet been announced.

Buffalo, N. Y.—American Body Co., capital stock $10,000, to manufacture motor and other vehicles; incorporators, Edward W. Selkirk, E. J. Freitas and J. W. Kelly.

Brooklyn, N. Y.—Berger Taxicab Co., capital stock $25,000, to manufacture and rent motor vehicles, wagons, trucks, carriages, etc.; incorporators, H. A. Berger, W. Wing and P. Wilds.

Brooklyn, N. Y.—Green Taxicab Co., capital stock $25,000, to purchase, deal in and rent motor vehicles; incorporators, D. T. O'Brien, F. G. Strobel and H. Jacobs.

Belle Harbor, N. Y.—Belle Harbor Garage, capital stock $5,000, to deal in and operate for hire motor cars, cabs, wagons, vehicles, etc.; incorporators, James J. and Nora Buckley and Edward J. Buckley.

New York—Kissel Motor Car Co., capital stock $50,000, to manufacture horseless vehicles, motors, engines, carriages and wagons; incorporators, F. S. Waldo, A. Kirkpatrick and J. G. Fitzgerald.

Syracuse, N. Y.—Motor League of America, capital stock $100,000, to manufacture motors, engines, cars and vehicles; incorporators, A. A. Schlater, E. Woods and T. A. Levy.

Jersey City, N. J.—Dreadnaught Tire Co., capital stock $2,000, to manufacture rubber goods, supplies, etc.; incorporators, Stewart Browne, W. L. Hopkins and G. W. Harris.

New York—Hudson-Fulton Automobile Co., capital stock $10,000, to deal in real estate, operate hotels, restaurants, liveries, etc.; incorporators, C. S. Peets, Daniel Teetoe and H. Burch.

Camden, N. J.—Pittsburg Auto Delivery Co., Inc., capital stock $125,000, to do a motor delivery business; incorporators, W. A. Pittis, A. Wood and V. A. Murray.

Indianapolis, Ind.—Indianapolis Motor Speedway Co., capital stock $250,000, to provide a motor speedway and other means of exhibiting motor cars; incorporators, Carl G. Fisher, J. A. Allison, F. H. Wheeler, A. C. Newby and Frank E. Sweet.

Buffalo, N. Y.—L. W. Holt Co., capital stock $10,000, to sell on commission motor cars, power boats and engines; incorporators, R. A. Kellogg, Elizabeth M. Nauth and Frances A. Moses, all of Buffalo.

Ainsworth, Neb.—An agency for the Auburn has been established here with I. Churchill in charge.

Sioux City, Ia.—The Pendleton Automobile and Machine Co. has moved into larger quarters at 315 Fifth street.

New York—D. L. Ormsby has taken the agency for New York city, except Brooklyn, for the Middleby.

Anderson, S. C.—The J. S. Fowler Co., of this city, has opened a sales room and has secured the services of J. C. Strubling, formerly manager of Anderson Auto Co. It intends to push the Lambert and Columbus.

Portland, Ind.—The Portland Automobile Co. has been organized and has opened a garage. It will sell new and used cars and supplies and has purchased the motor car department of the Jones Cycle and Automobile Co.

Fort Davis, Tex.—A company has been organized here called the Fort Davis Auto Co. to handle motor cars and supplies. E. H. Carlton is treasurer, M. Rixon secretary and H. A. King manager. The company is building a garage 34 by 100 feet.

Pittsburg, Pa.—James B. Godfrey, for the past 3 years battery man for the Standard Automobile Co., has gone into business for himself on South Highland avenue, where he will reconstruct and rehabilitate all kinds of batteries.

Appleton, Wis.—Edward Brill, manufacturer of motors for cars and boats, will pay especial attention to motor car work this season and is enlarging his plant. Mr. Brill plans to build several cars this summer on special orders from Fox river valley patrons, furnishing the engines and working parts.

Wichita, Kan.—E. W. Ames, of Caldwell, has taken the agency here for the Marmon and Oakland and has leased a building at 127 West Douglas avenue. Mr. Ames is closing out his stock of cars at Caldwell and henceforth will give his entire attention to the Wichita agency. The new business is under the management of G. W. Troutman, also of Caldwell.

Omaha, Neb.—Work was begun today on a modern garage and store room for the Baker Electric Co. at 2218 Farnam street. The building, which will be of brick construction, single story and basement, will also contain a power plant, and provisions for building, rebuilding and recharging batteries. This firm recently added to its line of the Detroit and Rauch & Lang electrics.

Among the Makers and Dealers

Columbia Represented—Fred R. Jenkins & Co. have embarked in the motor car business in Chicago, taking the agency for the Columbia. They are located at 1330 Michigan avenue.

Was Kansas City Concern—The Midland Motor Car Co., for which an application for a receiver was made, as mentioned in the issue of Motor Age of April 8, was not the concern manufacturing the Midland car, but a Kansas City company retailing cars.

Handling Trucks—Gramm-Logan motor trucks are the latest to invade the Cleveland field, the agency having been placed with E. P. DeGollier, of the Auto Shop Co., 731 Vincent avenue N. E. This will shortly be changed to a factory branch, with DeGollier acting as representative.

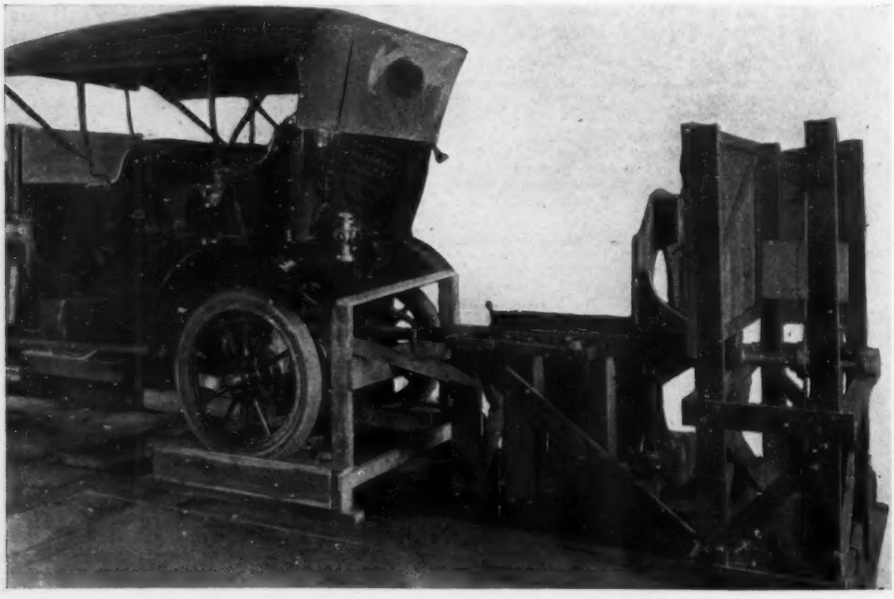
Blake Convalescent—E. P. Blake, New England distributer of Jackson cars, who was injured about a month ago in an accident, has so far recovered that he is now able to be about again, although not quite ready to drive his car. He left Boston a few days ago for a visit to the Jackson factory after which he will rest up before resuming business again.

McIntosh President—Charles L. McIntosh has been elected president of the Pierce Motor Co., of Racine, Wis., which was recently incorporated with a capital stock of $300,000 to succeed to the business of the Pierce Engine Co., of Racine. Frederick Robinson has been elected vice-president; James G. Cowling, general manager; Andrew J. Pierce, general superintendent; John Peebles, secretary, and Charles J. McIntosh, treasurer. The present plant of the Pierce Engine Co. will be enlarged by temporary additions. The site is too small to permit of extensive additions, and the company is casting about for a tract of land to suit its future needs.

Mutty Retires—Arthur W. Mutty, who has had charge of the Buick garage in Boston for some months, has resigned in order to take a much needed rest. Previous to going with the Buick he was with the Maxwell branch in Boston.

Studebaker Pathfinding—The Studebaker Automobile Co., of South Bend, Ind., is preparing a series of road routes leading out of South Bend. Route No. 1 is to Detroit and return, giving a choice of three different courses. No. 2 is to Chicago and return on a 101-mile schedule by way of LaPorte and Valparaiso. No. 3 route is to Indianapolis and back by two different ways. No. 4 is to Cleveland and return and No. 5 to Grand Rapids and back. Each route will be published in book form. In each route distances at all turns and land marks will be given.

Fined For Contempt—The latest concern to come into collision with the United States circuit court for making and selling imitations of the Rushmore flare front lamp is the Motor Car Equipment Co., of New York city. This concern was permanently enjoined over a year ago against selling, offering for sale, or advertising lamps made in colorable imitation of the Rushmore flare front design. At the palace show, however, it offered a catalog showing certain alleged imitation Rushmore lamps. An investigation showed that it had disposed of some of these. When the matter was called to the attention of the court it was held that these lamps were substantially imitations, and on March 24 the accused was adjudged guilty of contempt and fined $300, of which $250 was ordered paid to the Rushmore Dynamo Works.



METHOD OF TESTING HORSEPOWER OF THE FRANKLIN

Benson Handling Elmores—An agency for the Elmore has been opened in Indianapolis by H. U. Benson. He has taken quarters with the Beck garage, 25 West St. Clair street, where he is showing a line of 1909 models.

Theater Service Established—The Wisconsin Automobile Exchange, 220 Wisconsin street, Milwaukee, Wis., carrying the Stearns, Midland and other lines, has established a theater service. Five cars have been placed in the livery service, and a flat rate of $1 per couple for carriage from residence to theater and return has been fixed. The plan is new in Milwaukee and is proving a great success.

Fritchle Moves—The Fritchle Automobile and Battery Co., of Denver, last week closed a deal whereby it takes possession May 1 of the Mammoth rink building at the corner of Colfax and Clarkson streets. The building is a big brick and steel structure and when remodeled will make an admirable factory. This is the building where the show was held last year and which has since been used as a skating rink.

Has Three Plants—The Oklahoma Motor Car Co., of Oklahoma City, has outgrown its present facilities at that point, and has extended its business by opening another house considerably larger than its Oklahoma establishment at Dallas, Tex. The new establishment will be operated as a separate corporation under the name of the Southwestern Automobile Supply Co., 349-351 Commerce street. In addition to these, a third establishment is being installed at Dallas, under the title of the Overland Automobile Sales Co., to act as distributing agency for the Overland and Kisselkar in Texas and New Mexico.

Praise for Cadillac Workmen—On Saturday afternoon General Manager Henry M. Leland, of the Cadillac Motor Car Co., presented the employes of the firm with a formal letter, congratulating them on the winning of the Dewar cup as the result of the British standardization tests last summer, the trophy commemorating the most meritorious achievements in the world of motoring during the year, according to the terms of the award. The cup was placed on view for the day at the factory. Mr. Leland's letter praised in highest terms the careful work of the Cadillac employes and urged them to continue in their efforts to make the Cadillac a synonym for excellence. "I want you to feel that such efforts are and will be

appreciated and that when your efforts are above the average and stand out from the mass they will be recognized and rewarded,'' said the general manager.

Sheehan With Republic—P. O. Sheehan, formerly with the Diamond Tire Co., has been appointed Boston manager of the Republic Rubber Co., which has just opened quarters in the Hub.

Palmer & Singer Changes—The appointment of Charles A. Singer, Jr., as general sales manager of the Palmer & Singer Mfg. Co., vice William Botto, resigned, has just been announced. David Landau has also mounted a rung in the ladder, having been appointed chief engineer in the place of Oscar Stegeman, who recently resigned from this position.

Hanford Succeeds Hawkins—George H. Hanford, formerly connected with the Oldsmobile company and the Auto Shop Co., in Cleveland, has severed his connections with the latter concern and taken charge of sales for the Gaeth Automobile Co. Hanford succeeds Vice President R. E. Hawkins, who is now with the Overland line in Cleveland, although still retaining his interests in the Gaeth company.

Rambler in Hartford—Mansuy & Smith, one of the largest dealers in horse vehicles at Hartford, Conn., has taken on the Rambler. For some time past the firm has been doing considerable motor car work at 17-19 Elm street. This is the first time that the Rambler has been represented in Hartford for the past few years and the signing up with Mansuy & Smith is a direct result of the recent show.

Calls It Fal-Car—The Fal-Motor Co. is the successor to the Reliable Dayton Motor car Co., of Chicago, having taken possession of the plant at 15 North May street, where it is engaged in making a 30-horsepower four-cylinder car. The Speedwell Motor Car Co., 1355 Michigan avenue, has been named as Chicago distributer. The product will be styled the Fal-car, the Fal coming from the initials of the organizers of the company, Messrs. Fauntleroy, Averill and Lowe.

Testing Franklin Horsepower—In testing the horsepower of Franklin motor cars at the Franklin factory in Syracuse the engineshaft of a car is connected with a fan dynamometer, by means of which, through adjustment of its blades, any load desired can be put upon the motor. The engine is run at full speed and the number of revolutions per minute noted, and the dynamometer is so calibrated as to show the horsepower. Ordinarily only the engine is attached to the dynamometer, but the testing room is so arranged that in the case of experimental cars for the trying out of new models the entire car is admitted to the room, the engineshaft extended out through the rear of the running gear and a connection thus made with the dynamometer. The high speed attained makes this performance an endurance test, and records kept by those in charge of the work make it an economy test as well, the figures showing accurately the consumption of gasoline and oil under hard work.

Weisenfeld Spreads Out—Joseph Weisenfeld has secured the Baltimore agency for the Hupmobile. This makes the third agency he now holds. He also is representative for the Oakland and Reo.

Demand For Electrics—F. R. White, general manager of the Baker Motor Vehicle Co., declares that the company's sales for the month of March showed an increase of 30 per cent over the best month in the history of the company. Even though it has largely increased its factory force, it is running day and night endeavoring to turn out cars fast enough to supply the demand for Baker electrics.

From Anderson to Ambridge—The Magneto and Common Sense Auto Co. has bought the factory of the Ambridge Lumber and Building Co., at Ambridge, Pa., 30 miles down the Ohio river from Pittsburg, and will at once start a plant to employ fifty men. The company moves to Ambridge from Anderson, Ind., and expects to have 150 men working by September 1. It manufactures supplies.

More Quaker Garages—Suburban Philadelphia has just been provided with two fully-equipped public garages that will furnish accommodations for motorists which those sections have hitherto lacked. The Baring garage at Fortieth and Baring streets, West Philadelphia, is a one-story structure occupying 48,000 square feet of space, with all the equipment of an up-to-date establishment, including waiting and chauffeurs' rooms, repair pits, washing stands, outside gasoline storage, compressed air tanks, and a big repair shop where anything short of a broken frame or shaft can be fixed up. In Tioga Eugene C. Plachter will shortly open the North Broad garage at 3310 North Broad street. While slightly smaller than the West Philadelphia plant just mentioned, the Tioga establishment is as completely equipped for the work.

Handling Strombergs—The Alamo Automobile Co., of San Antonio, agent for the Stoddard-Dayton, has been appointed Texas representative of the Stromberg carbureter.

Craig Succeeds Diebler—Joseph B. Diebler, for the last 6 years representing the Haynes interests in Chicago, has resigned as branch manager and will remain in the motor car business as an agent. Diebler has been succeeded by Charles C. Craig, who has represented the company as traveling salesman.

Costlow a Gabrielite—The Gabriel Horn Mfg. Co., of Cleveland, O., lately opened new quarters at 1926 Broadway, New York, in charge of J. B. Costlow, who has placed on exhibition the thirty-seven tube horn made by the Gabriel company. This horn will be used in New York for demonstration purposes and will later be shipped to England for a tour to Europe.

More Atlanta Agencies—Sales agencies continue to multiply in Atlanta. The Selden is the latest of the many newcomers. A charter has been applied for in the name of the Selden Car Co. of Georgia and an agency opened at the Columbia garage, Edgewood avenue and Ivy street. G. G. Reid is in charge at present. The company is in search of a good location and will soon build a garage.

John Handling Marmon—George C. John, who has taken the New York agency for the Marmon car, is going to enter the Marmon in all events and contests possible. William N. Botto, formerly sales manager for the Palmer & Singer Mfg. Co., has accepted the general managership of the motor car and garage business conducted by Mr. John at 1706-1718 Broadway, New York city.

STUDEBAKER CAR ON ITS ROUTE-MAKING MISSION

Development Briefs

SHERMAN ROTARY LAMP BRACKET

GEORGE S. SHERMAN, of Great Neck, L. I., is patentee and maker of the swinging lamp bracket, Fig. 1, which he calls the Circle Rotary lamp attachment. The device has been tested for a year and found satisfactory. It consists of a lamp-carrying member, a lamp-swinging member and an independent lock that locks the brackets to or releases them from the swinging mechanism. Adjustment can be made so that the lamps will swing to the same angle as the front wheels when turning a corner or can be made to swing further than the wheels. An automatic catch holds the lights dead ahead except when the machine is turning, and slight movements of the steering gear, with which the attachment is connected, does not affect the lamps. Either or both lamps may be adjusted to swing as desired. The brackets are ball-bearing, strongly constructed, .e protected from dust and are non-adjusting. The brackets are socketed in forgings bolted to the side frame members in front of the radiator and project below the socket, where a rod connects them with the depending arm of the steering gear at a point above the regular steering rod. The forward end of this rod is provided with a ball socket clamp A by which it attaches to the arm B which is made integral with a sleeve C held loosely on the lower end of the shank D of the forked bracket. This shank is supported on ball bearings in a carrying member E intended to be bolted to the frame. Secured to the shank of the lamp-carrying member between the bearing support E and the lamp swinging member C, is a sleeve F, which is keyed to the shank D by a cotterpin G. The sleeve F is provided with an interiorly-threaded vertical hole offset from the shank D of the lamp-carrying member for receiving a double-ended locking bolt H. This bolt has a very high-pitch thread or worm, which is formed with a channel extending

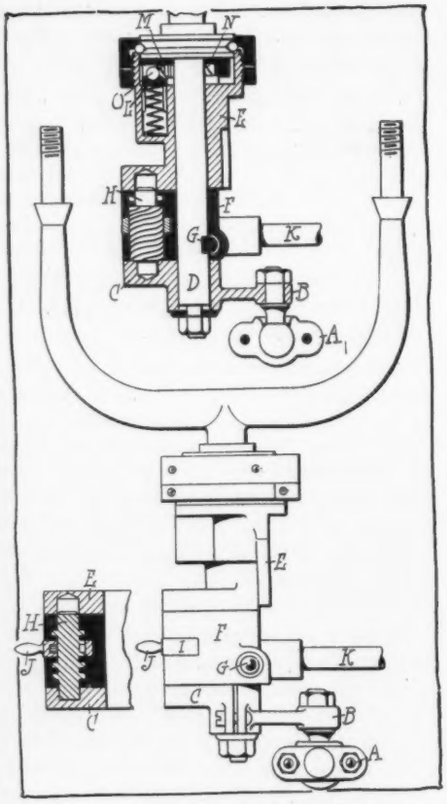


FIG. 1—CIRCLE ROTARY LAMP BRACKET

longitudinally through the thread. An operating collar surrounds the locking bolt and is provided with a handle J for convenient manipulation and with a lug that engages with and slides in the channel cut vertically through the worm. In operation, when the handle is moved to the right the collar turns, turning the bolt also and causing it to rise on its threads until the upper end engages the recess above formed in the member E, thus locking the sleeve F. When, on the other hand, the handle is moved to the left, the bolt H is caused to enter the lower socket formed in the sleeve C locking the sleeve F, keyed to the shank D, to the lamp-swinging member. In the latter position the lamp-swinging member is caused to move with the movements of the steering gear, while in the former position the lamp is held stationary. Forming an integral part of the sleeve F is an arm—not shown—extending rearwardly at right angles to the arm B. Attached to this is a crossrod K whose other end is attached to the corresponding arm of the lamp bracket socket on the opposite side of the motor car, so that both brackets are caused to swing together and to the same angle. By means of a spring-actuated plunger L and cam surfaces M and N, the pressure of the balls automatically returns the lamp to its normal position after it has been brought back approximately thereto and holds it there until positively dislodged by a decided turning movement of the steering gear. Lost motion in the steering gear and in the lamp swinging linkage has no effect and does not allow the lamps to wabble uselessly when the car is following a straight course.

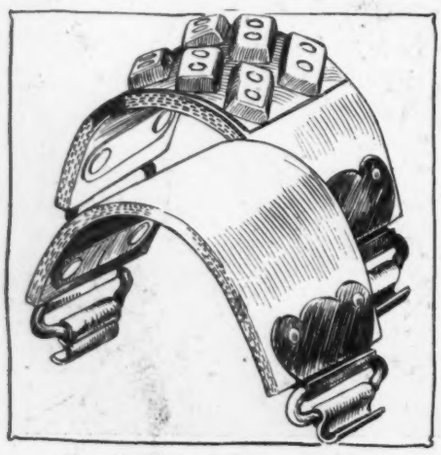


FIG. 2—WALKER BLOWOUT BANDS

DOUBLE-FACED MIRROR

W. F. Eckstein, 1223 Michigan avenue, Chicago, is marketing Friday's two-faced mirror, which, as illustrated in Fig. 3, can be attached by three screws to the upper right corner of any wind shield and in such a position enables the driver to see what vehicles are following him, which is of particular value in cutting across the street at a corner, or at other points where it is necessary to cross or go contrary to the general direction of travel. The two parts of the mirror are not of the same plane, the one-quarter oval portion being at approximately a 30-degree angle to the oblong part. This permits of taking in the street on either side of the car.

WALKER BLOWOUT BAND

The Walker Auto Tire Band Co., of Indianapolis, Ind., manufactures the Walker blowout band, which is intended to fit over the outer casing at points where blowouts occur. These bands are made of sea island cotton fabric frictioned together and covered on the inner and outer surfaces with rubber, with metal hooks on the ends for anchoring the bands in place beneath the clincher rim lips. The bands are made with a plain tread, or one covered with staggered metal plates secured by ⅛-inch rivets into the band. Any number of these bands can be used on a tire; in fact, the entire casing may be covered with them. They can be easily applied, no tools, other than means of refilling the tire with air, being necessary.

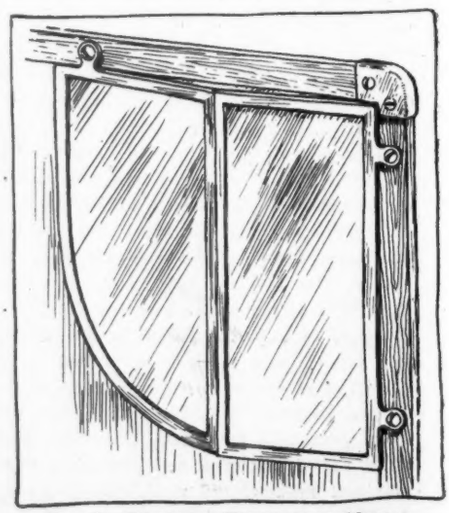


FIG. 3—ECKSTEIN WINDSHIELD MIRROR